Before the

Federal Communications Commission

Washington, D.C. 20554

In the Matter of	**)**	
	)	
A National Broadband Plan for Our Future	**)**	GN Docket No. 09-51

COMMENTS OF RICH GREENFIELD

June 8, 2009

I welcome this opportunity to offer a glimpse at the unique conditions and challenges that make telecommunication in Alaska particularly challenging. These comments have been organized using the original structure of the NOI. The Commission's questions are indicated in bold italics with replies given in regular font. Paragraph numbers refer to those used in the NOI itself. The Commission's footnotes were removed unless they were thought to be useful in interpreting the comment provided, e.g., in identifying the relevant section of the Recovery Act.

Approach to Developing the National Broadband Plan
Paragraph 12.

The Challenge of Geography[1]

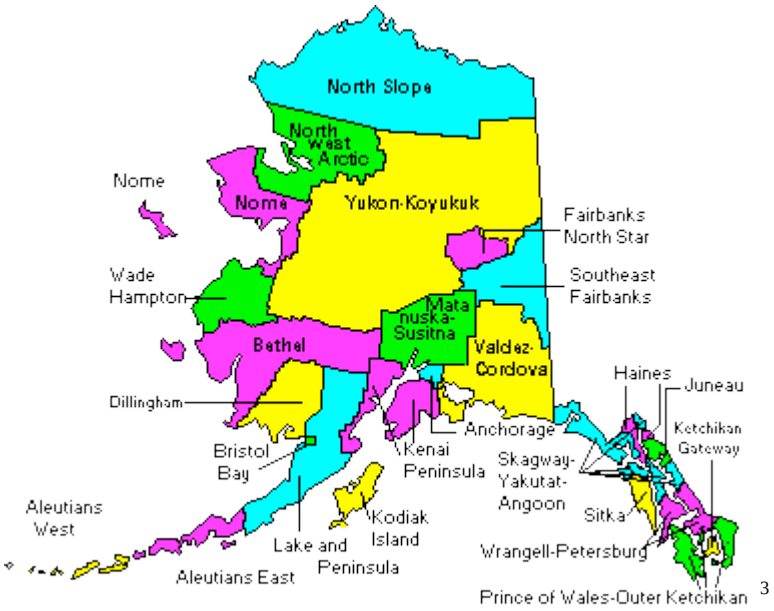
With a land mass of approximately 366 million acres, there are often great distances between communities in Alaska. Most communities are not accessible by land – rather by air or water –

[1] Alaska overlay on United States from http://nursing.uaa.alaska.edu/acrh/images/alaska_overlay_map.gif

and they may be a hundred miles or more from the next community.[2]. The federal government owns nearly 60 percent of Alaska's land, a fact that creates a special political climate in which there is continuous struggle over resource development, even over right-of-ways.

Furthermore, in Alaska, geography plays the major role in limiting community economic viability and growth. Like the communities in which they exist, anchor institutions (schools, libraries, post offices, university campuses, etc.) capable of providing community broadband access are physically and sometimes culturally isolated, not only from urban areas, but also from each other.

The Challenge of Population Dispersal



[3]

Alaska, which is divided into13 regional boroughs, has approximately 400 communities. In each borough, one or two main "hub" cities of 1,000 to 3,000 people service the surrounding region filled with small native villages of typically 10 to 500 people. Nearly ¾ of Alaska's communities have less than 1,000 people.

Providing affordable broadband to all residents of Alaska is an ongoing concern. Communities in Alaska not on the state road system have higher telecommunication costs, often by factors as high as 10 or 20 times, largely due to the cost of satellite circuits and satellite dish and equipment maintenance under unusually harsh weather conditions.

[2] Given the per foot costs of laying fiber of anywhere from $7 to $35 per foot, it will cost millions of dollars each to connect many of these communities with "future proof" broadband, if it is even physically and legally possible.
[3] Alaska boroughs map from http://www.xyz.net/~seldovia/images/ak_map.gif

[4]

Further, depopulation is a serious problem for many of Alaska's over 300 villages. This problem is exacerbated by an absence of affordable broadband access. Young people are driven to make their careers in urban areas, even though they might prefer to stay in their home communities. People must leave the villages to continue their education or to gain work experience and often do not return until they retire.

Who is being left out in current broadband deployment efforts? About 20,000 native Alaskans (out of a total state population of some 80,000 indigenous people) in more than 100 communities, and many additional tens of thousands of Alaskans if the requirement of "affordable" is added broadband access. There are at least three categories of communities that remain disadvantaged who will not obtain broadband in coming years without special self-help efforts and efforts made on their behalf:

- *Communities that lack connectivity altogether* (no local residential ISP): lack of business case, i.e., not enough people, not enough money, not enough interest? (e.g., if young people have left)

- *Communities that are underserved* (connected but no broadband): lack of business case, i.e., not enough people, not enough money

[4] Alaska map from http://www.fhwa.dot.gov/akdiv/images/alaska_map.jpg

- *Communities that are "stove-piped,"* i.e., broadband connected but not to the home; subsidies only for centralized not distributed access (e.g., E-Rate, RHC)

The Challenge of Economic Development

The absence of ubiquitous broadband makes economic development all the more difficult and, at the same time, important. In rural Alaska, the overall cost of living ties directly to fuel and transportation costs: food, manufactured goods, electricity, etc. - everything costs more as the cost of fuel goes up.[5] During the most recent decline in the price of oil, Alaskans are still pay one of the highest gasoline costs in the nation. Where residents of the three largest Alaskan urban areas pay 4% of household income for fuel, rural households – with much lower average household income - are paying as high as 40%.[6] The overall drop in fuel costs has yet to ripple through Alaska's economy. The dramatic rise and fall in fuel costs may be temporary or recurrent, but this uncertainty should not prevent the economic recovery and stabilization of these communities.

The Challenge of Broadband Deployment

As part of a national broadband plan, any consideration of broadband deployment strategies for Alaska might best begin with a series of questions that, even if they cannot be answered, provide a suitable framework for discussion. The same questions can be asked by most states with substantial rural populations:

- By the time all Alaska communities get residential access to current DSL and wireless connectivity, with "high-speed" rates above a few hundred kilobits in at least one direction, won't these speeds be viewed as the equivalent of yesterday's v.56 dial-up modems?

- From a purely technical standpoint, if there are successive waves of broadband technologies with increased transfer rates in the coming years, how many of these will be appropriate to deployment in Alaska?

- Among the technologies which do prove suitable for Alaska environments, at what rate will they be deployed – in five and ten year cycles after their adoption in urban areas? What will this mean in terms of rural economic development, i.e., jobs, in rural Alaska?

- Finally, is there any way for Alaska break out of this lag-time cycle and get ahead of the curve?

[5] Isolated Alaska villages buy fuel once per year, in advance, when coastal and river-going barges can deliver during the summer.

[6] *Dollars of difference: what affects fuel prices around Alaska?* by Meghan Wilson et. al http://www.iser.uaa.alaska.edu/Publications/researchsumm/RS_68.pdf

These comments take the position that *in the race for broadband, there is no finish line*. Since no one currently knows the best uses of greater and more affordable bandwidth, there is not even yet a shared concept of "excess" bandwidth.[7] One consequence of the lack of any broadband "finish line" is that the problem of rural connectivity will not be resolved even when a certain bit rate is achieved, any more than the demand for greater bandwidth in urban areas will be satiated at some given time in the future when new applications are no longer created. If not, humans will always find inventive ways to "waste" bandwidth far in excess of what government bureaucrats have defined as appropriate minimal entitlements. [8]

The broadband bandwidth problem is really one of *comparable bandwidth and pricing*; actual bandwidth and cost only serve as points of comparison, *i.e.*, they are a way of measuring the widening and narrowing of an ever-present digital divide. The pertinent question for unserved and underserved residents in all 50 states and territories:

> *Can unserved and underserved communities effectively compete for businesses and jobs if they are always behind in the bandwidth race or paying substantially more for bandwidth?*[9]

The obvious answer is, "no, absolutely not;" after all, it is only logical that knowledge-based businesses and their workers will migrate to communities with, among other things, lower bandwidth costs and rural communities wishing to attract such jobs must have access to cheap broadband to compete successfully. [10] To be fair, it can also be asked whether all rural communities really want to pursue, with a lemming-like docility, the technology-dependent future of the dominant, urban culture. Certainly the Amish and many other communities have chosen not to do so.

---

[7] This issue bears a resemblance to that of the minimum memory needed in personal computers, i.e., there was a time when early adopters of PCs thought that 64k RAM was all the memory any one could ever possibly need. Of course, memory-intensive applications have changed all that and there is no end in sight in terms of how much memory is too much: it all depends on what tasks the computer is asked to perform. The same *immeasurability* applies to bandwidth: would it be "excessive" for an end user to monitor a dozen or more channels of full-screen, high-quality streaming video and have different styles of music continuously playing in different rooms of the home? What if the end user was running a security company from her home? In such cases, even broadband defined in the hundreds of megabytes might quickly prove inadequate. There is considerable doubt that a single strand of fiber delivering a gigabit per second will be adequate bandwidth to the home ten years from now.

[8] A simple example would be the Internet-connected picture frame which constantly presents great art work from the worlds' museums, with audio commentary if desired. More complex would be Internet-connected windows with real-time views from the world's greatest attractions – wildlife preserves, cruise ship cameras, etc. And most complex would be virtual realities in which significant others who are physically distant would be virtually and continuously there.

[9] Just as there is the luck of the *early adopter* – good luck at being in the right place and having the necessary money – there is less well-recognized situation, the bad luck of the *last adopter,* who often ends up with an outmoded technology. Federal USF policies to the home – tied as they are to what the majority has already adopted - doom rural Alaskans (and other unserved and underserved communities) to be last in line, assigned to play the part of the *poor relative*.

[10] Isn't there a precedent here: the REA, which did attract industry to rural areas because of "excess" electrical power that was sold at below-market cost?

In Alaska, the answer to this question might well differ between villages, just as they now differ on their policies towards alcohol and pull-tabs. In the future, Internet-free communities in Alaska are not inconceivable, but before such prohibitions get voted into effect, one would expect that the communities would need at least a little first-hand experience with the Internet, some of which is coming now through public libraries and schools (though not every Alaskan community has a school or library).[11] That being said, almost all Alaska communities, when given the opportunity, always indicate a strong interest in faster and more affordable Internet connectivity.

The Misnomer of a National Broadband Plan

Given that the term broadband remains undefined and subject to change, t might have been better for the Congress to have tasked the FCC to produce a national *bandwidth* plan rather than *broadband* plan. Never will "all the people of the United States" receive exactly the same amount of bandwidth. Unless the definition of broadband includes whatever speeds and functionality available over satellite at any given point in time, ALL the people will never have broadband access because, absent a miraculous technological breakthrough, there will always be the isolated few who can continue to receive Internet services, if at all, only by satellite. Perhaps there comes a point in the best national broadband deployment plans when it must simply become a matter of choice: an individual or family which chooses to live alone and outside of any established community can only expect to receive the minimal affordable connectivity required to be an active citizen. Unavoidably, satellite is still the most cost effective means of delivering such minimal connectivity. Excluding even this limited role for satellite service from national broadband access plans would leave a considerable number of persons, families and places having dispersed populations (e.g., homes miles apart) outside the scope of the plan and without any cost effective, sustainable means of inclusion.

Satellite services, whether termed "broadband" or not, should be made available and affordable, even to those without cash incomes, i.e., those living a subsistence lifestyle. If individuals and families desire greater bandwidth than what is available over satellite, then such persons must join a larger community. Small, stable communities of remote citizens should be entitled to receive affordable terrestrial broadband, by means of microwave or fiber, dependent on geography and on how far they are from other larger, well-established communities.

The nation may find that it is most economical to serve this most-widely-dispersed of all populations by subsidizing satellite bandwidth services with programs modeled after Link-Up and Life-Line when

[11] In Alaska, only communities with 10 or more school age qualify to receive school funding from the state.. Libraries are only found in communities that raise and obligate $7,000 in cash and in-kind services per year. In contrast, communities with populations of only 25 can still demand telephone service from the Carrier of Last Resort. Anecdotal evidence indicates that Internet access in rural schools is creating a generation gap between children, their parents and elders. The "digital divide" between information-haves and have-nots begins at home. Adults sometimes are reacting with muted hostility to the growing mastery of children over a resource that is currently unavailable to adults in most rural villages (E-Rate subsidized bandwidth to the schools cannot be used by the communities themselves or their individual members, despite the FCC's "Alaska Waiver").

terrestrial broadband solutions are not economical or physically possible. Nevertheless, broadband funding like that available through ARRA should never be redirected from areas without broadband access to areas that already have basic broadband access unless the economics of terrestrial broadband deployments prove prohibitive or unless these diverted funds are used to build-out to unserved and underserved areas.

The more complex issue is not merely to make basic broadband available but to make it affordable and desirable. National satellite service coverage means that minimal broadband is already available in most places in the United States, The lack of higher Internet penetration via satellite means that these services are simply unaffordable, undervalued in terms of their utility, or, given their current technical limitations, simply not worth the price being asked. Broadband satellite services have shown they can meet basic broadband requirements, with certain exceptions (e.g., synchronous applications), but it remains to be seen to what extent the technology can evolve to provide higher levels of service in terms of speeds and support for new and advanced applications.

Paragraph 13 As we consider this task, we keep in mind and follow the instruction Congress provided to the Commission in the Recovery Act and seek comment on each element of the instruction. First, we seek comment on how to implement a plan "to ensure that all people of the United States have access to broadband capability," including how to address the Congressional directive to "establish benchmarks for meeting that goal."[12]

Before the FCC can implement a plan "to ensure that all people of the United States have access to broadband capability," the FCC must develop and draft the plan itself. To do that successfully, the FCC must come to know both the wide diversity of communities and ethnic groups that make up the people of the United States, particularly those outside of the mainstream. This NOI represents the FCC's first attempt to gather information in this regard with respect to the formulation of a national broadband deployment plan.

The purpose of this filing is to give FCC Commissioner's and staff additional insights into the geographical environment and rich cultural heritage of our state and how, even today, these two factors define the telecommunication needs of the state as well as the potential, and often, complex solutions which will have to be devised to meet these needs. Like other states with rural and isolated minority populations, the lives of rural Alaskans greatly differ form that of the average American. To begin with, the majority of Alaska communities do not have access to the road system.

How should broadband capability be defined going forward, and what does it mean to have access to it?

[12] Recovery Act § 6001(k)(2).

Broadband capability is a moving target. Something similar to the "majority" rule of thumb in the adoption of advanced services should be used in defining broadband at any given point in time, i.e., when new broadband capabilities have been adopted by over xx% of the population, then providing equitable and affordable access to those particular capabilities should become a short-term goal and priority of the FCC.

Ubiquitous access to broadband means that it is made universally available and affordable, i.e., whoever wants it or needs it can get it. Availability should be defined both in terms of geography (wherever one is - e.g., all U.S. territory) as well as ubiquity (whatever one is doing – driving, flying, sailing, hiking, etc.). With respect to broadband deployment, ubiquity and mobility are obviously two different things, the first having to do with being available everywhere and at any time, while the second has to do with being available while the end user is in motion. If we are to achieve both broadband ubiquity and mobility, it will only be through use of satellites and wireless technologies, in combination with fiber and other point-to-point wireline technologies.

Second, we seek comment on how to provide "an analysis of the most effective and efficient mechanisms for ensuring broadband access by all people of the United States."[13]

Identifying the most effective and efficient mechanisms for ensuring broadband access by all people of the United States will each require the following research:

> A. An on-going inventory or sampling of the life-styles, living accommodations, personal and professional habits and activities of all Americans with respect to their broadband behaviors and preferences. Research and studies such as those performed by the Pew Foundation's Internet & American Life Project are essential; however, future studies must pay greater attention to documenting the diversity of the American population when it comes to language skills, physical disabilities, travel times, etc. and how this diversity defines different communication needs.
>
> B. A thorough and on-going analysis of telecommunication technologies at both the network and device levels that documents current and future broadband capabilities to the greatest extent possible.
>
> C. Consistent, continuous and transparent data collection and monitoring with immediate feedback and real-time analysis capabilities.

The national broadband plan should be a living document associated with on-going activities to keep it up-to-date and forward looking. It must be revised regularly and open to input beyond this initial NOI if it is to have long-term value and impact on national broadband deployment.

[13] Recovery Act § 6001(k)(2)(A).

Third, we seek comment on how to develop "a detailed strategy for achieving affordability of such service and maximum utilization of broadband infrastructure and service by the public."[14]

Broadband costs do not exist in a vacuum: broadband affordability is tied directly to the health of the overall economy. To someone who has lost a job, anything less than free broadband may be unaffordable. Affordability is a question of individual or household income: what percentage of average income should go to telecommunication? To broadband specifically? Most telephone affordability studies have found affordability, based on actual expenditures, to range between 1-3% of family income. This is one area in which it would be worth comparing costs to those in other countries, as well as to documenting other similar metrics used in determining affordability of other essential services, e.g., electricity, water.

Fourth, we ask about how the Commission should evaluate "the status of deployment of broadband service, including progress of projects supported by the grants made pursuant to this section."[15]

This evaluation should be done by means of interviews of project managers as well as recipients of the broadband deployed, both online and in-person, as well as through review of the metrics grant recipients are required to collect and submit.

Fifth, we seek comment on how to develop "a plan for use of broadband infrastructure and services in advancing" a variety of policy goals.[16]

For the most part, these uses will happen naturally and will not lend themselves to direct management, unless congress begins to require the use of broadband in these specific policy areas. See below for additional comment.

We also seek comment on how we should evaluate the development of a national broadband plan in light of a variety of other related statutory directives and whether additional elements should be included in the national broadband plan.

Related statutory directives should be evaluated in terms of how they can contribute to a national broadband plan, or, in the alternative, how they might act as obstacles to the success of such a plan. Analyses should outline options for amending, redefining, or removing these directives, whether through legislative or administrative processes.

[14] Recovery Act § 6001(k)(2)(B).
[15] Recovery Act § 6001(k)(2)(C).
[16] Recovery Act § 6001(k)(2)(D). Specifically, the national broadband plan must include "a plan for use of broadband infrastructure and services in advancing consumer welfare, civic participation, public safety and homeland security, community development, health care delivery, energy independence and efficiency, education, worker training, private sector investment, entrepreneurial activity, job creation and economic growth, and other national purposes." *Id*.

Finally, because this plan will not be solely the Commission's to implement, we seek comment on how the Commission, in both the development and implementation of a national broadband plan, should work collaboratively with other agencies at all levels of government, with consumers, with the private sector, and with other organizations.[17]

Beside traditional interagency task forces and committees, email lists, and other social networking modes of communication (e.g., Twitter) could be employed to bring about closer cooperation and coordination in this effort. Interagency webcasts and podcasts are also recommended as they may help to evaluate at first-hand both the benefits and limitations of the current telecommunications infrastructure ad explore the many improvements that can be made to it.. The greater the openness, inclusive and encouragement to participate, the more successful the national broadband plan development process will be. In the end, it is the nation as a whole that will implement the plan.

Establishing Goals and Benchmarks

Defining Broadband Capability

Broadband can be defined in myriad ways. In order to ensure that all people of the United States have access to broadband capability, we must make sure that the Commission appropriately identifies goals and benchmarks in this regard.

Paragraph 15. Here, we seek comment on how the Commission should define "broadband capability."[18] ***In the discussion below, we seek comment on how this definition should capture the various issues we should consider as we define broadband capability, including how to take into account the various existing and emerging technologies.***

Little time should be wasted debating definitions of broadband. In this regard, too complicated or rigid definitions of broadband could have the opposite effect to the one intended: such definitions could restrain broadband deployment by setting low thresholds that turn into terminal destinations, beyond which the marketplace need not go absent another national broadband plan. Why not simply say, like the NEA says about art, that "a great nation deserves great broadband" and set the goal as the fastest broadband in the world to the end user. Set a goal to become the number one country in terms of broadband per capita, i.e., highest average bandwidth available per person.

Paragraph16. For instance, the Commission currently uses the terms "advanced telecommunications capability,"[19] ***"broadband," and "high-speed Internet."***[20] ***Should these***

[17] *See* Recovery Act § 6001(k)(3) ("In developing the plan, the Commission shall have access to data provided to other Government agencies under the Broadband Data Improvement Act (47 U.S.C. 1301 note)").
[18] Recovery Act § 6001(k)(2).
[19] We note that Section 706 of the 1996 Act states, "The term 'advanced telecommunications capability' is defined, without regard to any transmission media or technology, as high-speed, switched, broadband telecommunications

definitions be unified, or should they have separate meanings for different purposes, keeping in mind that current and future broadband platforms will increasingly support "high-speed Internet" as one of several offered services including voice, video, private data applications, and the like?

At this point in time, all three of these terms mean more or less the same thing in the public mind. In addition, they are all relative, i.e., flexible enough to include speed increases. Intentionally or not, the three terms are often used interchangeably. The broadest of the three terms would seem to be "advanced telecommunications capability" in that it is neither tied explicitly to broadband, nor tied to the concept of the Internet.

What the term Internet means is also morphing as the Internet supports, and thereby absorbs in the pubic mind, more and more advanced applications. If one accepts that the Internet is a global data communications system, then it becomes a question of whether the use of TCP/IP is the single factor that distinguishes the Internet from other networks. Given the ability to wrap data packets within a wide variety of transport protocols, it seems appropriate for the term Internet to go beyond the use of TCP/IP.

It is recommended that the term "advanced telecommunications capability" be kept and widely utilized to apply to new and yet-to-be-imagined technologies and services, while the terms "broadband" and "high-speed Internet" be acknowledged as synonyms to be used interchangeably in the future.

In addition, to the extent that broadband is defined by "speed," should the Commission consider raising the speeds that define broadband?

If the Commission is going to maintain useful speed metrics, then it must periodically raise the speeds that define broadband as overall broadband speed increases. Broadband speed statistics, while useful at a very simplistic level, are largely meaningless and often misleading given that little systematic monitoring of ISP speed claims is being performed. In general, consumers simply measure their bandwidth in terms of slow or fast with respect to their individual throughput needs. In the long term, the Commission should move towards megabits per capita and oversubscription ratio data collection in order to offset the effects of shared environments.

Should we distinguish among the various broadband technologies?

Yes, they must be distinguished since the numerous factors contributing to true speed, i.e., end user throughput, will vary between technologies. These individual factors are what need to be identified, described, and assessed in determining the differing qualities – advantages and

---

capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology." 47 U.S.C. § 157 nt (d).

[20] *Section 706 Fifth Report*, 23 FCC Rcd at 9716, para. 2.

disadvantages – of each given broadband technology in any particular environment and for any particular purpose, even when technologies are used in combination.

Are there specific Commission actions that could encourage more rapid adoption of these more advanced broadband deployments using mobile wireless technologies, such as Worldwide Interoperability for Microwave Access (WiMAX), Long Term Evolution (LTE), or wireline broadband deployments, such as fiber, DSL, or coaxial deployments supporting DOCSIS 3.0, for example?

The global market will largely drive these developments though federal and state investment incentives could significantly accelerate these deployments. Together with other federal and state agencies and non-profit consumer groups, one of the most important things the FCC can do is to provide information that concisely and accurately describes these advanced broadband deployment technologies and their benefits as they are developed.

By making this information openly and easily available to the public, well-informed consumers can bring their collective buying power to bear on the market to get the services they want and need deployed more quickly. This factual, technology-neutral consumer information service, used in conjunction with the national broadband map the NTIA has been tasked with creating, might prove to be a powerful tool in building demand for the next appropriate advanced broadband deployments throughout the country.

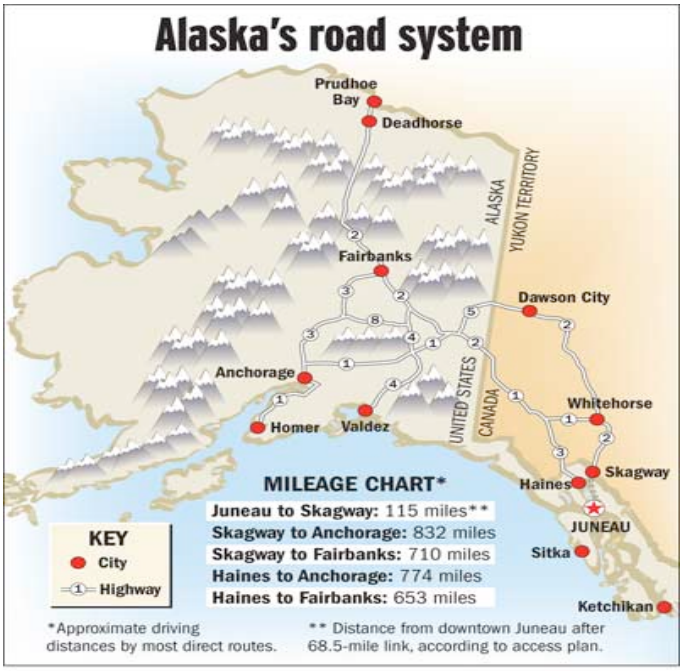
The Commission should be careful not to fall into the "one solution fits all" trap that different segments of the telecommunications industry have pushed in their NTIA/RUS NOI comments, particularly the fallacy of fiber-only solutions that many communities have embraced as "future-proof." Quite simply, fiber broadband deployment alone will not solve the national broadband problem because fiber cannot be deployed everywhere, for both economic, environmental and legal reasons. An insistence on fiber-or-nothing is not in the best interest of many rural areas and most unserved areas. There is, however, a general consensus that a fiber and fixed wireless combination – in addition to satellite services – can be an effective solution in most any area. This is usually referred to as the terrestrial broadband solution.

Alaska is the largest state and yet it is largely roadless.[21]To install fiber, you would first have to build access roads to get the trucks there in the first place. The fiber would have to cross federal,[22] state[23] and native lands.[24] What will happen when the January 2001 Roadless Area

[21] Map from http://www.juneauempire.com/road/images/Alaska_Roads.jpg

[22] "The federal government is still the largest landowner in Alaska with 60% of the total area (222 million acres). This acreage includes national parks, wildlife refuges, national forests, military reservations and the North Slope National Petroleum Reserve. More than a dozen federal Agencies manage federal lands in Alaska. The majority of federally owned lands have been set aside for public use (approximately 80 million acres). These are designated as follows: The National Park Service and Fish and Wildlife Service manage about 119.3 acres (48.3 and 71.0 million acres respectively) for primary uses of resource protection and fish and wildlife conservation. The Forest Service and Bureau of Land Management manage about 97.7 million acres (19.8 and 77.9 million acres respectively) for multiple use purposes including timber production, fish and wildlife, recreation, water and mining. Management of these lands is based on priorities and compatibility among various uses. The remaining federal land is designated for

Conservation Rule is fully reinstated?[25]



On March 30, 2009, President Obama signed the Omnibus Public Lands Management Act, placing a mere 2 million acres of public land in nine states under Wilderness Act protection. It grants the highest level of protection to these lands and prevents construction of power lines, roads and cell phone towers. In contrast, Alaska already has 48 wilderness areas totaling almost 58 million acres. How can "ubiquitous" broadband be deployed in such areas? The ARRA broadband programs, and certainly any future National Broadband Plan deployments, will need to be coordinated with the Department of the Interior, which oversees roughly one-fifth of the

---

special purposes, such as military reservations, the National Petroleum Reserve and U.S. Postal Service lands." http://dnr.alaska.gov/mlw/factsht/land_own.pdf.

[23] To date, the state has received patent to approximately 85% (90 million acres) of its total and made selections of 105 million acres (28% ownership of its total area) The state was permitted to select lands, from any federal land not already reserved for other uses, to provide: 1. Land and resources to support the state's economy for road construction, economic development, and building houses, schools, and other public and private facilities. 2. A reduction in federal control over state internal affairs by giving the state ownership and jurisdiction over its own land. The state chose land to meet three specific needs - settlement, resources and recreation." http://dnr.alaska.gov/mlw/factsht/land_own.pdf.

[24] "Native lands are private lands. The Alaska Native Claims Settlement Act, passed by Congress in 1971, mandated the creation of regional and village Native corporations for the disbursement of the 44 million acres and payment of one billion dollars mandated to Native ownership. Thirteen regional corporations were created for the distribution of ANSCA land and money. Twelve of those shared in selection of 16 million acres, the thirteenth corporation, based in Seattle, received a cash settlement only. 224 village corporations, of 25 or more residents, shared 26 million acres. The remaining acres, which include historical sites and existing native-owned lands, went into a land pool to provide land to small villages of less than 25 people." http://dnr.alaska.gov/mlw/factsht/land_own.pdf

[25] Interior Secretary Ken Salazar has only until May 9 to reverse the Bush changes to Endangered Species Act rules.

land in the United States, and with other relevant federal Agencies.

Thousands of visitors to these federally controlled unserved and underserved areas want excellent communication services in their housing and camping facilities and when out hiking, but at the same do not want telecommunication towers or satellite dishes which might mar their wilderness views, not to mention having a detrimental effect on wildlife or the local ecology.[26] Then there are the thousands of residential in-holders in these areas, small communities and single families that still have no - or inadequate - Internet service, not to mention broadband. Finally, the USFS and NPS need improved telecommunications services for their own purposes, which include research and data collection, administration and public safety. Installation of cell phone and microwave towers in these areas are already a highly polarized issues.[27] Even the general public knows that fiber does not deploy well in river and streambeds, nor on glaciers and is known to be quite susceptible to earthquakes and volcanoes.

Thus, it is not difficult to imagine the multi-year permitting delays that will occur as the legal process takes its normal leisurely course should attempts to deploy fiber be made in these areas. Because of cost, environmental and legal problems, fiber will never deploy in vast regions of the United States, at least not in the decade or two given current deployment practices. Because fiber is limited to point-to-point connectivity, it must always be used in combination without broadband deployment technologies.

Optimistically, a national fiber deployment might serve 90%of the nation in terms of population, but what of the other 10%. They, presumably, would be left to other forms of terrestrial broadband. But what of the remaining 1-3% to which no other forms of terrestrial broadband, including wireless, are available? No doubt these fiber-only comments are well meant, and if there was a national commitment in the hundreds of billions of dollars to ubiquitous fiber deployment to all communities within five years, there might even be a consensus on a fiber-only policy; but in the absence of such a commitment, what are remote and rural communities, the unserved and the underserved, supposed to do for broadband connectivity in the meantime?

Fiber-only proposals are naïve, misdirected and unfair, as well as unrealistic, when analyzed with respect to the extremely complex and variable nature of the telecommunication landscape nationwide. For certain, there will always be important and essential uses for satellite services when it comes to mobile, emergency, public safety, and national security needs for ubiquitous broadband connectivity as opposed highly robust, point-to-point broadband connectivity.

Are there other advanced broadband technologies that, if deployed, might better position infrastructure for continued evolution?

[26] Many NTIA/RUS filers spoke all too facilely about the need for "ubiquitous broadband," for which there is probably, as of yet, no national consensus: do we as a nation want the safety of ubiquitous cell phone service at the cost of the intrusive presence of cell phone towers in wilderness areas? Will clunkier satellite phones and EPIRBs suffice? The same issues apply to broadband and microwave towers. If we are to achieve broadband ubiquity and mobility, it will only be through use of satellites and wireless technologies, in combination with fiber and other point-to-point wireline technologies.

[27] For example, http://www.nps.gov/yose/parkmgmt/upload/hetchycomments1.pdf In addition, H.R.2516, a bill "To protect inventoried roadless areas in the National Forest System," has been gaining in congressional support with each congress.

One example in the field of mobile radio communication, to a limited extent, LTE (3GPP or 3rd Generation Partnership Project) serves as a euphemism for future service improvements, retaining enough flexibility to include newer wireless technologies as they emerge. The FCC might want to undertake, or encourage other agencies (e.g., NSF) and institutions of higher education, to support research into the nature of standards development and succession in various industries, including telecommunications to understand if there are general principles as to how standards evolve.

Apart from expediting new advanced broadband technology deployments, the other pressing issue today is to seamlessly integrate existing technologies to produce hand-offs which are invisible to the end user. One major obstacle to greater public adoption of broadband services is the multiple subscriptions and devices, not to mention chargers and other peripherals, currently required to achieve any level of ubiquitous connectivity. Though gradually becoming "ubiquitous," current broadband coverage is far from continuous.

At this stage in the development of a universal digital communication environment, there is too much incompatible stand-alone technology. This complexity alone – accompanied by the increased costs of supporting end user equipment with competing proprietary standards – is slowing the adoption of broadband technologies by the general public. Consumers are often confused and wary, particularly since broadband providers are bundling content and services with bandwidth in order to brand what would otherwise be a simple commodity. Ultimately, as the historical distinction between creator and consumer continues to blur, the contemporary sleight-of-hand trend of bundling exclusive content (i.e., DTV and movies) by ISPs in order to sell broadband access may be reversed and self-help content selection become available directly to the consumer over any broadband connection.

Paragraph 17. We also seek comment on whether a definition of "broadband" should be tethered to a numerical definition or, instead, an "experiential" metric based on the consumer's ability to access sufficiently robust data for certain identifiable broadband services.

A tethered numerical definition is meaningless as a measurement of service to the end user if the service speeds are not continuously measured and actually delivered, rather than merely representing "best effort" claims or goals. By themselves, speed measurements are too simplistic as an adequate measurement of broadband services for informed user choice. In contrast, experiential metrics are reality-based and can represent a common set of evaluative mechanisms that related directly to widely used broadband capabilities and functional operations and behaviors, i.e., they measure what people are capable of doing with the bandwidth available.

In either case, data must be collected over time and analyzed for patterns in order to identify when broadband is sufficiently robust for particular operations and when it is not. Besides upstream and downstream network management practices, this analysis must also include

multitasking on the part of the end user. Given the number of factors which influence the end user experience, this will be a difficult but worthwhile exercise. Frequent flyers are not so much concerned with detailed accounts of why a particular flight is delayed but rather in the on-time percentage for the flights of a particular airline as compared with other airlines. The online Internet experience is no different: end users want to be empowered with the necessary information and insights to make intelligent choices in terms of their ISP.

In addition, the Commission needs to probe more deeply into the meaning of "bandwidth" itself, making full use of the engineering expertise available in the private and higher education communities where several analyses have already been made.[28] The AdTran NTIA/RUS filing proposes "…that 'speed' be defined based on a sustainable data rate, that is, a rate that will be experienced by individual subscribers with at least 99% probability even during times of heavy usage. The rate should be calculated using agreed upon, transparent algorithms and parameters based on the analyses presented in this paper. This definition will promote consistency across disparate access network architectures and will help ensure that a connection meeting the definition of broadband supports a reliably sustainable minimum rate." [29]

Defining how bandwidth is to be measured (as opposed to defining broadband) is a valuable and worthwhile exercise which will help the ISP industry to come across less as used car salesmen and more as scientists when explaining their services to their customers. These kinds of insights already held by network engineers need to be shared, through the adoption of ISP industry standards of measurement, with broadband consumers so they know just what they are acquiring when they gain access to broadband services.

In this regard, should we define broadband in terms of bandwidth and latency, capability to download a certain type of media in a certain amount of time, ability to access a certain online service or operate a certain application without depreciation in quality, or by some other metric?

"Yes" to all.

As recommended above, each broadband delivery technology should be described in terms of its advantages and disadvantages: every technology has both. Each broadband technology will eventually find its appropriate niche.. One danger of developing a national broadband plan is that in the rush to completion it will be too simplistic and rigid with a tendency to emphasize one or two technologies that are presumed to "fit all deployment scenarios. That would be a tragedy for Alaska and other unserved and underserved areas. While on occasion one technology may leap

[28] For example: John Duggan's NANOG Tools Overview presentation: http://www.nanog.org/meetings/nanog43/presentations/Dugan_N43_ToolsOverview.pdf and the AdTran NTIA/RUS fiing entitled *Defining Broadband Speeds: an Analysis of Peak vs. Sustained Data Rates in Network Access Architectures* at http://www.ntia.doc.gov/broadbandgrants/comments/7C86.doc

[29] Ibid.

frog another, as with cell phones in Africa, in other cases there may be a normal evolutionary path that must be followed where broadband deployment follows overall economic infrastructure development. Communities without utility corridors (roads, power lines, and other established right-of-ways) cannot simply lay fiber on the ground, e.g., fiber normally requires a substrate and, ideally, permanent road access when run overland.

Perhaps it would be better to refer to this process determining what is meant by broadband as "describing" rather than "defining" broadband characteristics. There is no one, single "thing" as broadband: all broadband technologies have characteristics that affect the capabilities associated with the bandwidth being provided, i.e., to some extent, the technologies used define what can actually be done with the bandwidth provided. This is merely to say that all broadband is not the same and that the capabilities of any particular bandwidth are dependent on the underlying broadband technologies used to deliver the bandwidth.

For example, the biggest disadvantage of fiber is also its primary strength: that it is "wireline." To provide airborne broadband, we cannot use fiber alone, but instead a combination of fiber together with satellites and terrestrial wireless technologies. In order for everyone to speak the same language and better understand what can be done with the bandwidth provided, these characteristics, particularly when they are limiting in nature, must be identified, documented and described so that the layman understands the limitations involved with the broadband accessible through that particular technology. For example, with satellites, this would include not only speed in what is essentially a shared environment, but also power, latency and jitter, the impact of rain, snow, sun spots, etc. Even within the satellite technologies, one must distinguish between the different characteristics of different satellites (e.g., C- and Ku-Band) and the satellite dishes (e.g., tailgate dishes, VSAT dishes, Earth Stations).

Furthermore, should such performance metrics apply only for the local access link, for the end-to-end path, or some other portion of the network?

Since some "best efforts" are better than others, standardized metrics and levels of service should be developed for all segments of the end-to-end path, and for all the relationships of these segments one to another (these relationship are not necessarily sequential in nature). The development of these metrics should be left to the private sector, but their identification and validation as relatively objective measurements should be reviewed by the FCC or the FTC in much the same way as the FTC examines advertising claims for other products and services.

To what extent should our consideration of access to broadband capability take account of the middle mile?

Broadband access must take the middle mile into account, otherwise it cannot address end-to-end capabilities. When it comes to end-to-end throughput and the consumer's ability to accomplish specific tasks, the middle mile is just as important as any other mile, as recently pointed out in the Commission's Rural Broadband Report:

> "The Federal Communications Commission's Report on a Rural Broadband Strategy includes issues involved with the "middle mile" that connects the last mile Internet service provider with an Internet backbone service provider. In many cases, the rural broadband provider will need to obtain backhaul transport from more than one provider, often over facilities that were designed for voice telephone or cable television services," the report states. "Some of these 'middle mile' facilities may have insufficient capacity, causing the transmission speed on otherwise adequate last-mile broadband facilities to come to a crawl or stall before the data reach the Internet backbone. Overcoming this may require the construction of a dedicated facility, which drives up costs and can deter last-mile broadband investments. Moreover, even when the last-mile provider acquires access to adequate middle-mile facilities, that access may be prohibitively expensive." The report goes on to offer several possible solutions, such as "encouraging middle-mile build-out, revising universal service funding to help cover costs of the middle-mile and using current or potential infrastructure more effectively by coordinating with other infrastructure projects to shrink deployment costs, and reforming interconnection obligations."[30]

Much of the focus on broadband deployment has been on last mile connections. Is there a need, for instance in rural areas, for a greater focus on broadband capabilities in the network beyond last-mile connections?

There is a need for focus on broadband capabilities end-to-end from anywhere to everywhere and back. In the absence of robust middle mile connectivity, rural areas are reduced to high-speed bandwidth WANs or VLANs (Village Local Area Networks) with no external connections. In Alaska the middle mile is most often the network link missing. A recent OECD report[31] also emphasizes the importance of targeting the middle mile for government support:

> "Investments which bring high-speed backbone networks to a large number of rural communities may be more efficient than projects which pay for last-kilometre connections to homes in a limited number of areas. Policy makers who have committed to investing in markets may decide to invest in high-capacity backbone infrastructure to some rural and remote areas as a way to extend affordable, high-bandwidth connections to the largest number of inhabitants in these areas as possible and leave the last-kilometre connectivity to the private sector. Public investment could be used to target spending on high-speed open access networks providing connectivity to rural schools, hospitals and other public institutions as anchor points for high-speed connections in the community. Private ISPs could then interconnect at these points and distribute access directly to users using their own facilities and services."

[30] "FCC Rural Broadband Report Notes Middle Mile, Consumer Demand Concerns," Telephonyonline by Joan Engebretson

[31] *The Role Of Communication Infrastructure Investment In Economic Recovery* at http://www.oecd.org/dataoecd/4/43/42799709.pdf

How robust are broadband capabilities in backbone and feeder networks throughout the country?

However robust is defined, from an end user perspective, the answer is often simply "not robust enough." If it has not already, the Commission should reach out to professional organizations in this arena to solicit both their comments and advice. [32] Apart from network engineers, very few users have the vocabulary to describe the various mechanisms which can actually measure broadband capabilities. The overall robustness of the Internet is a matter of continual debate, the most recent flap surrounding the inauguration coverage of President Obama.[33]

Paragraph 18. We also request comment on whether a definition of broadband should be static or dynamic, with speed tiers that adjust with changes in technology.

The definition should be dynamic. Much simpler is to define bandwidth, simply by measuring it and mapping it to a decimal scale, e.g., 900 kbps, 0.9 mbps, 0.0009 gbps. Every few years the decimal point can be moved further to the right to keep thing simple. Ten years from now we might be measuring bandwidth in gigabits. Obviously it does not make sense for the speed tiers to remain the same as technologies progress. –It may be more relevant to settle upon a heuristic for deciding when "advanced" technology is no longer to be considered "advanced." Should the concept of "advanced" be tied to penetration rates? For example, when an advanced technology has been adopted by more than 50% of the businesses and households in the nation, then it becomes "basic" rather than advanced. Definitions and standards for broadband speeds should be linked to metrics that automatically adjust as higher broadband speeds are adopted. Static thresholds or ranges are not what is needed.

Further, we seek comment on the definitions for broadband used by other government agencies and how any such definition by the Commission would impact the various government programs designed to improve consumers' access to or use of broadband services. For example, should the Commission define broadband in the same manner as other agencies charged with implementing parts of the Recovery Act?

No, not automatically. An in-depth understanding of broadband, however it may be defined by agencies implementing the provisions of the Recovery Act, will be needed over the long-term in the development and execution of a national broadband plan. The national broadband plan

[32] For example: the North American Network Operators' Group (NANOG): an educational and operational forum for the coordination and dissemination of technical information related to backbone/enterprise networking technologies and operational practices. http://www.nanog.org/; the IEEE: professional association for the advancement of technology http://www.ieee.org/portal/site; and the Internet Engineering Task Force (IETF): an international membership community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. http://www.ietf.org/overview.html

[33] http://asert.arbornetworks.com/2009/01/the-great-obama-traffic-flood/
http://www.merit.edu/news/newsarchive/article.php?article=20090120_inaug

should be written with deliberate speed but with sufficient reflection to correct any of the deficiencies and inconsistencies of the broadband programs funded through the Recovery Act.

We also seek comment on any definitions for "broadband" used in other nations or international organizations that may be useful to the Commission in this proceeding.

The OECD Statistics Directorate (www.oecd.org/std) provides comparable economic and broadband statistics for its members. The OECD also promotes and develops international statistical standards and co-ordinates statistical activities both within the organization and with other international agencies. The Statistics Directorate FAQs (www.oecd.org/std/FAQ) can help in finding data series for OECD countries and some non-member countries as well as definitions of statistical terms.

Paragraph 19. Because a range of technologies may be used to provide broadband services in a variety of situations, we seek comment on whether to adopt different definitions or standards of what constitutes broadband based on the technology being used to provide the service or the context in which the service is applied, or some combination of both.

Yes, to the extent they are needed and necessary, definitions or standards of what constitutes broadband should be based on the technology being used to provide the service and on the context in which the service is applied. The challenge is to track and document the changes in the technology (e.g., DOCSIS vs. DOCSIS 3.0) and the changes in the context of the service being provided (cable TV vs. HDTV).

For instance, should a different set of standards be used to identify mobile broadband services – which allow mobility or portability but may have lower throughputs – and fixed broadband services?

Yes. Find a common denominator and map comparable data elements one to the other, or look for some basic pattern matching in terms of capabilities or uses. In the case of broadband, the common denominator is bits per second and the common capabilities are such things as downloading a file, participating in a videoconference, etc., i.e., common meaningful activities which occurs on multiple technology platforms. More often than not, the most interesting things in cross-platform comparisons are the differences rather than the similarities.

At any given point in time, *that broadband is best which gives the highest throughput anyone can get from a group of competitive technologies*. One of the Commission's responsibilities is to identify current speeds for each technology and track these speeds as they change. After price, what people care about most is what they are able to accomplish with the bandwidth that is accessible to them at any point in time.

Should the definitions vary depending on whether the broadband service is used to serve residential or business customers and if so, how?

No. Differences between business and residential broadband uses are rapidly disappearing. The distinction, which is historically based in long distance telephone service for purposes of cross-subsidies, is no longer useful. ISPs should not be able to charge more simply because the end user is a for-profit organization. We are all professional human beings when we are interconnected with broadband, part of an emerging "world brain."

Should rural regions, with their inherently higher deployment costs, have different definitions or standards for broadband than urban areas?

No. Levels of broadband services may differ between urban and rural areas, but the definition of broadband should not differ in what can be accomplished with a given technology and a given bandwidth in a given period of time. Some technologies are simply not currently appropriate for use in rural areas because of rural (remote) topologies, geographies, dispersed populations, and so on. There should be no classes of citizens created through disparate access to broadband capabilities due to geography alone.

How should satellite technology with comparatively limited bandwidth and higher latency but potentially lower cost of deployment in rural regions be accounted for?

The marketplace will "account" for the strengths and weaknesses of satellite service by determining its value overtime. As traffic migrates from satellite to WiMax and fiber, satellite circuits may actually come down in price, at least temporarily, and play an essential role in the global digital environment in its ability to provide ubiquitous connectivity and an additional level of network redundancy, particularly during certain emergencies and natural disasters. The different uses for satellite-based broadband technologies, such as rapid deployment over large areas, mean that satellites will continue to pay an important role in building out ubiquitous broadband access.

However, if the national broadband plan focuses exclusively on broadband connectivity and satellite access is not classified as broadband, then tens of thousands of Americans throughout the country will be left out of the plan, unless it outlines the expenditure of around $1 trillion and gives solutions to the environmental, legal, and other obstacles that stand in the way of universal terrestrial broadband coverage. Until that expenditure is made, satellite will continue to play a crucial role in providing minimal connectivity to underserved and underserved areas

Should our definition include some baseline dependability metric?

Probably not. More useful than a baseline – which will constantly change between applications and services - would be a simple sliding metric to measure overall reliability which would depend on a wide variety of factors no matter what the technology.

Are there other dependability concerns, such as susceptibility to weather disruptions, that need to be addressed now or in the future?

Yes, there is a set of such dependability concerns for each technology that should be evaluated and subjected to traditional risk management techniques and practices. Long-term environmental and health liability factors should also be identified, noted and assessed in determining overall dependability ratings. Civilization does not have a good record in identifying such dependability concerns, especially when the given technology has a tendency to kill human beings over the long-term, e.g., lead in tin cans, asbestos as an insulation in building construction, pesticides in agricultural production, car pollution, etc. The list continues to grow because, like the frog in the warming pot of water, humanity is slow to recognize changes in its environment and the health risks that accompany every new technology.

As to weather, besides extraordinary amounts of rain (in southeast Alaska, which is famous as a temperate rainforest e.g., 212 inches per year in Ketchikan), there are equally extraordinary amounts of snow and ice in Alaska, which interfere with several broadband technologies, especially wireless ones. In addition, Alaska satellite services experience sunspot disruptions twice a year. Finally, Alaska experiences continual earthquakes, as many as 100-200 per week, on the lower magnitude scales of 1-4.[34]

Paragraph 20. In addition to the bandwidth and number of simultaneous users, the data rates delivered to wireless end users depend upon, among other factors, transmitter power, frequency re-use, and the distance between the end user and the base station. More specifically for actual speeds on a wireless network, should they be determined at the edge of the service contour, and if so, what service contour level would define the edge of service?

Service contour levels are theoretical constructs that function with limited accuracy depending upon the parameters included in their construction, e.g., levels of field strength, determinations as to noise limitation, antenna gain, and transmission-line loss of the receiving system. Factors such as picture quality and acceptable statistical variation of the field strength with time and location are subjective decisions. Consequently, service level contours alone should not be used to determine the edge of service. Customers of a particular wireless broadband service should have web-accessible feedback mechanisms available for reporting and sharing actual experiences with the network edge under various conditions.

To what extent should the number of simultaneous users be considered when defining the individual end user data rates since the network capacity may be shared with many other users at the local level?

[34] See the USGS' Earthquake Hazard Program webpage and the maps for Recent Earthquake Activity in the USA: http://earthquake.usgs.gov/recenteqsUS/Maps/AK10/55.65.-160.-140.html

To the extent that operational oversubscription and contention rates should be made publicly available for purposes of QoS comparisons between providers. Consumers have a right to know how the networks to which they subscribe are being managed at a granular level if the network management practices impact Quality of Service or pricing. The example of the airline industry and its reporting requirements on the percentage of on-time arrivals and departures may serve as a model.

Actual data throughput must be collected over time and publicized. Consumers should be able to choose ISPs based on the level of service documented through past "best efforts," just like any publicly sold stock or commodity is tracked in the marketplace and just as vendor products and services are reviewed on major websites such as amazon.com. Consumers should be able to switch bandwidth providers easily and not be constrained by long-term contracts. In addition, or alternatively, statistics should be published regularly indicating the data rates provided to subscribers of different packages (best effort speeds) over time in the form of web-accessible graphs.

In general, how should the speeds and other characteristics of services delivered to consumers be determined?

They should be determined in the overall context of Quality of Service. They should be measured from various perspectives, including but not limited to: average speed, mean speed, range of speeds, consistent throughput, latency, download and upload rates; and end-to-end throughput.

Paragraph 21. We invite comment as to the state of deployment of broadband services that are offered under our rules for unlicensed devices.

Should they be considered as a means of providing broadband service, particularly where no other service exists?

Yes, simply because unlicensed wireless devices will be increasingly used by intermediaries and end users to extend the range of their broadband service. The important difference between licensed and unlicensed bandwidth lies in the speed with which they promote change and innovation, i.e., preventing the increased use of unlicensed devices will slow the pace of innovation, which occurs largely at the edge of the network.

If so, how should that service be defined or quantified since unlicensed devices are not necessarily associated with specific areas of operation?

Because they are unlicensed, these services probably cannot be "defined" in any static way since they will come and go and change location frequently. Quantification should be based on the number of wireless routers and other devices sold. Periodic surveys might be taken of unlicensed devices to determine their density in representative environments and to estimate interference

levels and spectrum saturation. Interference standards should be more widely distributed to and understood by owners of unlicensed devices so that interference disputes can be resolved amicably at the local level whenever possible.

We note that unlicensed devices operate on a non-interference basis and must share spectrum with all other such devices. Accordingly, a particular quality of service or data speed often cannot be assured. Should we treat data speeds and metrics for unlicensed devices and services differently because the sharing scenarios and their impact on reliability and data speeds are difficult to predict?

No, data speeds and metrics for unlicensed devices and services should not be treated differently. They should be subjected to the same level of analysis that other shared technologies receive for the factors that impact their levels of reliability and data speeds. Metrics for unlicensed devices will be hard to collect and analyze and their initial development is probably best left to the owners of those devices, working through their user groups and professional associations (e.g., the American Radio Relay League (AARL) http://www.arrl.org/tis/info/part15.html) . These groups, in turn, will work closely with the Commission to identify useful metrics, standards and new technologies which may help to minimize interference in an ever more heavily utilized spectrum segment.

Paragraph 22. With technology developing at such a rapid pace, it is important that we do not lose sight of the potential for monumental shifts in technological platforms that would render definitions obsolete or indeed harmful to developments that might otherwise take place in the market. We thus seek comment on how potential definitions that we apply in furtherance of a national broadband plan can be effectively designed, i.e., appropriately focused to achieve important social goals but sufficiently flexible to adapt to a continuously and rapidly changing technological environment.

The problem with definitions which contain thresholds or baselines is that too often they become goals in themselves and get treated as maximums rather than minimums they were intended to be. With respect to broadband, definitions can serve as milestones but never final destinations. Further comparative research on how other nations define broadband and how they handle the pace of technological change in their own national broadband plans may be beneficial as these nations' definitions of broadband evolve.

Defining Access to Broadband

Paragraph 23. The Recovery Act sets a goal for the national broadband plan of seeking "to ensure that all people of the United States have access to broadband capability."[35]

[35] Recovery Act § 6001(k)(2) (emphasis added).

We seek comment on what it means to have access to broadband capability. For instance, we seek comment on whether our determination of availability should take into consideration the provision of broadband at locations, such as at home, at work, in schools, in transit, in libraries and other similar community centers, and at public Wi-Fi hotspots.

Yes. All of the above and more – the full range of human activities and habitats where broadband service is technically feasible. Ubiquitous broadband access is the overarching goal of a national broadband plan. In addition, the seamless handoff of broadband services between these network segments will ultimately be required.

Further, we seek comment on how to interpret this term regarding access for businesses and other non-residential entities, including those that may serve as anchor tenants in a community.

Humans play many different social roles. The differences between business and residential entities are fast disappearing. Broadband access should be available to support all legal human activities whether personal or professional.

We also seek comment on whether to interpret the term differently depending on the technology used or whether it is used in a fixed, nomadic, or mobile context.

The term "broadband" will naturally have a different meaning in each distinct context, though the overall essence of the word when used by itself remains the same, i.e., maximum bandwidth. However, when a single term is used differently in too many contexts, it soon loses its meaning and much of its usefulness. That loss has already occurred with the term "broadband."

The suggestion seems to be to define broadband in conjunction with each technology and each context: satellite broadband, wireless broadband, microwave broadband, mobile broadband, fiber broadband, fixed wireless broadband, etc. That seems to be what is already naturally occurring within the telecommunications industry. The Commission should be careful not to produce definitions which get overtaken by developments or popular usage.

Paragraph 25. To what extent should the Commission consider price or marketplace competition for broadband as it considers whether people have access to broadband capability?

Retail price will play a crucial role in ARRA grant and loan programs as it is usually the final determining factor in any sustainability model. If the potential subscriber base resists the retail price used in the model, the project is unsustainable on its face and adjustments will have to be made immediately. Satellite-based services are something of an exception because, given the size of their footprints, these services can survive with a relatively low take-rate among a dispersed base of potential subscribers since per subscription costs are relatively low and there are no incremental last mile costs.

To meet the universal service principles of the 1996 Telecommunications Act, Section 254(b)(3),[36] retail price must also bear some relationship to average household income in a geographical service area if it is to be used in measuring "reasonably comparable rates" between consumers, including low-income consumers and those in rural, insular and high cost areas, versus those in urban areas. A suggested percentage range of household income would be 1-3%. Thus, a household with an income of $30k would theoretically be able to spend $300-900 per year on telecommunication subscriptions ($25-75 per month) while a household with $60k of income could spend $600-1800 per year ($50-150 per month) and a household with $120k of income might spend as much as $1200-3600 ($100-300 per month).Even with reasonably comparable rates, households with lower incomes would actually be expected to get proportionally less bandwidth or services. This should be kept in mind if broadband funding Agencies choose to set minimal broadband thresholds, particularly when they are trying to promote broadband deployment in rural areas where the average household income is less than in urban households.

Ultimately, access to broadband capability must be defined in terms of availability and affordability, not merely one *or* the other. "Access" to broadband capability that is unaffordable to specific communities of users is a cruel hoax. Unaffordable broadband access is broadband access denied. Both price and marketplace competition must be monitored, documented and analyzed to determine whether people have actual access to any given set of broadband capabilities, even when they choose not to take advantage of such access. Broadband access through public anchor institutions is a valuable intermediate stage for creating a greater awareness and appreciation of the benefits of broadband but it does not take the place of eventual ubiquitous and continuous broadband access in the personal and professional lives of all the people of the United States.

For example, how should the Commission consider the benefits of consumers in a particular area having only a single provider, using one type of technology, versus the competitive benefits that could result from having one or more providers using similar or different technologies?

On the whole, from the end user's perspective, having a single broadband provider is better than no broadband provider at all; however, where that monopoly provider abuses its dominant position by preventing new market entrants or refusing to deploy new and better broadband technologies, then the single provider becomes the greatest obstacle to improved broadband services. Absent oligopolistic practices and active collusion, consumer choice in broadband access is always preferable to no consumer choice because competition generally results in better

[36] "ACCESS IN RURAL AND HIGH COST AREAS- Consumers in all regions of the Nation, including low-income consumers and those in rural, insular, and high cost areas, should have access to telecommunications and information services, including interexchange services and advanced telecommunications and information services, that are reasonably comparable to those services provided in urban areas and that are available at rates that are reasonably comparable to rates charged for similar services in urban areas."

pricing and higher quality of service. Obviously having one or more providers using similar or different technologies is desirable, unless this competition undermines overall affordability of broadband access by splitting a market that is simply too small to support more than a single business model because of infrastructure investment costs.

To the best of its ability, and within the normal scope of its data collection practices, the Commission should identify and track at a granular level the locations where there is only a single broadband provider or technology available and determine whether this is due to technical or financial (investment) reasons. Working with local communities and the provider industry, the Commission should then actively work to lower barriers to entry for new competitors and to refer illegal business practices preventing broadband competition to the Department of Justice.

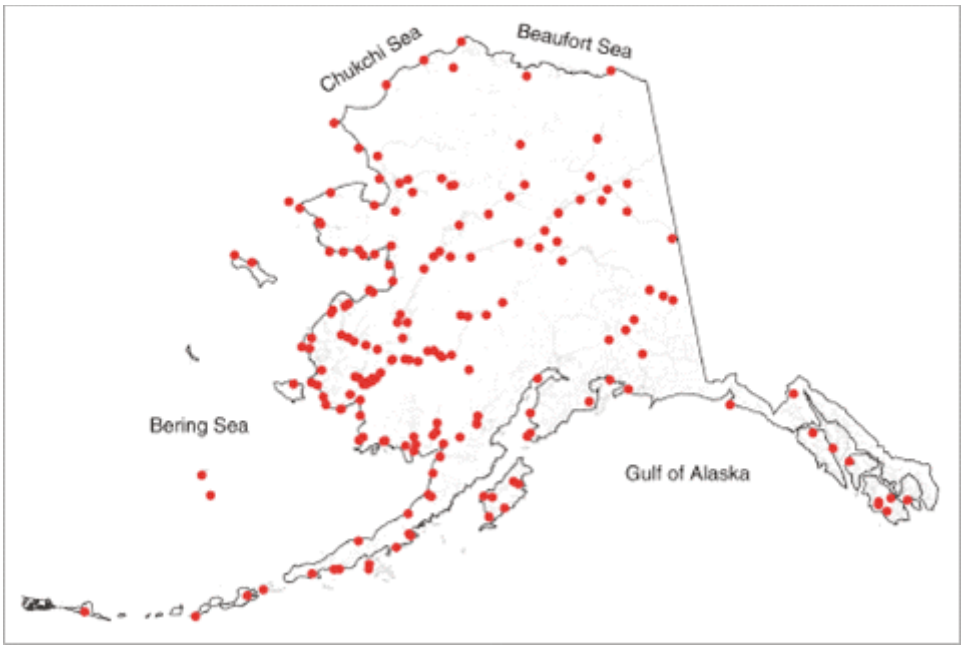
How should the national broadband plan establish priorities for unserved areas versus areas with limited competition and capability?

This is a very important question. Deploying advanced broadband (e.g., fiber) to the thousands of small and isolated unserved communities throughout the nation may well cost more than FTTH to the rest of the country altogether. One must apply the 80/20 rule of thumb at least twice before one gets to these communities: once, to separate urban from rural and again to separate rural from isolated and remote. As mentioned previously, in Alaska, rural does not necessarily mean "farmland," more often it means wilderness; it does not mean chickens, cattle and pigs, it means caribou, bear, moose, and salmon. i.e., subsistence living. "Isolated and remote" means no access to the public road system and only access by boat, plane, ATV, snow mobile, dog sled or hiking.

Despite the disproportionate expense of connecting these unserved communities, they should receive the highest priority in the national broadband plan, not only for their own sake, but for the sake of the many federal and state agencies which have legal responsibilities to communicate with the residents of these communities for various educational, vocational, legal and administrative reasons. We are talking about the exercise of basic federal and state constitutional rights in terms of civic participation and communication with governmental authorities. This is the essence of what is meant by network effects.

With full national deployment, for the first time in several hundred years, remote and isolated communities will be able to actively participate in, not just passively observe, the life of the nation, and the rest of the nation will be able to get to know of the existence of these communities and the wonderful diversity they represent. At the same time, these communities will have an extremely powerful tool to help themselves become better informed and to develop strategies to preserve their communities in the face of numerous challenges they face.[37]

[37] *Alaska Native Villages: Limited Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion* GAO-09-551, June 3, 2009 http://www.gao.gov/new.items/d09551.pdf



Alaskan Villages Affected by Flooding and Erosion:Source: U.S. GAO report

Additionally, as more and more of these communities are getting involved in supporting visitors through ecotourism, visitors are coming to expect if not demand full-blown broadband capabilities, especially when it comes to health care and public safety. Broadband deployment addresses the economic survivability of these communities at so many levels.

The fundamental problem of unserved and underserved areas is the lack of viable sustainability models. Until there is major universal service reform that includes the availability and affordability of broadband access,, there will be no significant penetration of broadband services in most unserved areas and little broadband improvement in underserved areas. Though there will always be communities which are behind in terms of broadband speeds and capabilities, the key is that no community is left there permanently to fall even further behind. This is the concept of broadband equity. *Unserved and underserved communities have been waiting the longest in terms of equitable access and affordability.*

What metric should be used to define wireless access?

No single metric can define wireless access (or any other form of broadband access). For each broadband technology a metric grid – this can be relatively simple - of factors that go into measuring quality of service should be constructed. Factual data from all the appropriate network segments should be collected by the Commission and consumer groups and end users can fill in these grids to determine their overall quality of service at any point in time. Ideally, this data collection, analysis and visualization would be automated.

For instance would an end user have access if located within a particular service contour?

No, not necessarily, because service contours are theoretical constructs that do not always accurately reflect the end user experience.

Or would it be based on measured data rates at the end user location?

Yes, data rates should be based on actual testing at the end user location.

Should the Commission consider access to wireless broadband from satellite or cellular providers in areas that are not served by wireline systems differently from areas where wireline services are available?

On the one hand, the Commission should not consider them different because they are not different, i.e., they are the same service. On the other hand, if broadband access from satellite or cellular providers in an area are the only modes of broadband access, then they should be not excluded from various support mechanisms because of speed thresholds in broadband definitions that have been subsequently adopted in various federal support mechanism. Collect real aggregated ISP data throughput statistics. Move to support mechanisms that work on a sliding per megabit/gigabit scale which is continuously adjustable.

Moreover, how should the Commission view the price constraining and substitutability relationships between various fixed wireline services and between fixed wireline services and fixed or mobile wireless services, including both terrestrial and satellite services?

Each service performs an essential part of the overall integrated network services environment that is emerging, though some network segments may be "more essential" than others because of widespread usage (demand) and higher throughput requirements. When viewed one against the other, most if not all services probably have price constraining relationships.

The interrelationships between different services should be analyzed but they will develop and change at a rate that will be hard to track and more difficult to assess. Very rarely if ever will any one service completely substitute for another. The ultimate judge of broadband substitutability is the consumer, not the Commission.

How would speed definitions and other regulations attached to grants, loans and universal service distributions affect affordability and pricing of services?

Grants, loans and universal service distributions in support of broadband access should be based on improved broadband access as demonstrated with baseline testing before the support is committed and enforced through individual SLAs (Service Level Agreements), not generic best effort definitions with broadband speed minimums. Since speed correlates positively with price and price with affordability, speed definitions will only serve to inflate the cost of universal service support. The overall goal should be postalized bandwidth pricing, no matter what the speed, i.e., nationwide cost per megabit.

Paragraph 27. We also seek comment on the extent to which access hinges on affordability.

Low take rates only reinforce how important it is to define the problem of broadband deployment as one of *affordability* as well as *accessibility*. Unlike the many nations which have made official government commitments to bring broadband directly to every citizen, the U.S. Congress chose, through the 1996 Telecom Act, to only commit public monies in providing Internet access in schools and libraries, not communities or homes. The underlying philosophy which has emerged is one of encouraging deployment by assisting the private sector to deliver products and services, by building a market through investment incentives, and by only subsidizing demand under special and restricted circumstances, *e.g*., libraries, K-12 education, and rural healthcare.

Affordability impacts rural residents in two ways: not only is high-speed access in rural areas more expensive, but residents there are *less able to pay* for advanced telecommunications services due to lower incomes on average. Professor Robert LaRose of Michigan State University has commented that:

> "High-speed Internet usage is lagging in rural areas even where it is available. We need to find out why that is. If we do not, rural Americans could fall into a new digital divide that will make them second-class citizens in an information society."[38]

More research in the area of Professor LaRose's 2008 report on closing the rural broadband gap is needed.[39]

For instance, how should the Commission consider broadband services fully deployed to an area, but set at a subscription cost that is unaffordable to some or many residents of the area?

Unaffordable broadband is inaccessible broadband. If the subscription cost is unaffordable to some or many residents of an area, is it not "reasonable and comparable" to similar urban based services.

Effective and Efficient Mechanisms for Ensuring Access

Paragraph 36. In the development of a national broadband plan, the Commission is charged by the Recovery Act with including "an analysis of the most effective and efficient mechanisms for ensuring broadband access by all people of the United States."[40] We seek comment generally on how effective and efficient existing mechanisms have been, whether

[38] *MSU Wins $408,000 Grant To Study Rural Broadband Impact* , September 29,2004, at http://www.mitechnews.com/technews/bydate.htm?id=10964304000004

[39] *Closing the Rural Broadband Gap: Final Technical Report* November 30, 2008 at https://www.msu.edu/~larose/ruralbb/

[40] Recovery Act § 6001(k)(2)(A).

they are marketplace mechanisms, or activities of governmental or non-governmental entities that supplement or complement the market mechanisms.

This issue would be easier to address if the Commission would publish and maintain a list of the existing or needed mechanisms which it feels will ensure broadband access to all the people of the United States. Obviously the existing mechanisms are inadequate because there is still apparently a need for national broadband plan.

The Commission itself needs to do a good job of explaining the concept of universal service in its national broadband plan by asking and answering the question of *"why should we as a nation, care about equitable broadband access?"* The arguments traditionally given are that every generation of communication and transportation technology has served to bind the nation - and the communities which make it up – more closely together, even while the same technologies now allow us to pursue our interests as individuals under the freedoms a democratic form of government fosters. Thus, inventions like the printing press, the postal service, the steam engine, the railroad, the telegraph, the radio, the telephone, the motor car, the airplane, and the television, technologies whose original manifestations were often developed by and for the rich, eventually came to strengthen the nation as a whole through a process of *product democratization* or, as it is more commonly termed, *commodification,* which is a term that connotes both access and affordability.

With lower costs and wider distribution of each of these technologies through what have sometimes amounted to painfully slow processes of market penetration, citizens were empowered as individual human beings to express themselves and participate in their own communities of interest, even as they built powerful industrial states based on the same technologies. After repeated experiences with such technology breakthroughs, there is a general consensus among most political persuasions that citizens without equal access to these technology-based products, especially those relating to telecommunications, are less than full citizens in their ability to exercise their rights and that this disenfranchisement, however small and subtle, is a detriment to society and the nation as a whole.

Disputes arise, for the most part, over how best to remove these access to technology distinctions among citizens. There are a great variety of models from which to choose. Defining access to a particular product as a "right" does not guarantee the expedited spread of that product; in the case of the radio, the car and the television, it was definitely demand and competition that lowered costs and resulted in rapid market penetration. How important is the product (i.e., one time purchase) and service (i.e., perpetual payment) distinction? If cars, radios, and TVs were ever subsidized, mail and telephone services were. In its current pricing models, the Internet is more of a service than a product, though the expansion of Wi-Fi has the potential to change public perceptions of the Internet, i.e., that it is something which is there or not and which can be used for free when it is there – more like public water fountains and restrooms.

There is no shortage of possible models. While cars may not be subsidized, the highway system on which they run is. Passenger railroads are subsidized too, as well as some rural airline services. The postal system, subsidized since its inception has been phased out, replaced by commercial and not-for-profit service. Radio and television were, until relatively recently, supported solely through advertising. State- and local-supported libraries have been used to give printing press output (books, newspapers, and serials) access to all citizens for over two centuries, while federal- and state-supported universal service funds ensure access to local telephone services. Now governments the world over are faced with the same issue: the advent of Internet technologies and how to bring their benefits to all citizens, benefits that have a much wider application and cost range than earlier technologies.

If the way that governments define citizen rights to participate in society must change as the technologies change, then what rights – if shared equally - should citizens have to Internet access? And what contrary obligation is there, if any, to support the continuation of historically isolated communities with unique and special lifestyles? If a lifestyle involves a different standard of living altogether, a standard which defines the very lifestyle, should telecommunication services be the same or even comparable to those found in the mainstream culture? Ultimately, decisions on these issues will be taken for practical reasons, but solutions that are deemed "practical" are often defined by underlying morality and idealism.

For example, if physical isolation is an inherent part of rural living, should it be a goal of national and state social policies to mitigate that isolation? What long-term effects could this have on population distribution, e.g., by destroying the very characteristics of the communities that are most valued and in need of protection? In the long run, it may come down to issues of identity: do we all want to be the same or different? Can we share technologies equitably and yet use them to celebrate our differences? These are issues which we have not yet come to grips with as a nation, but the technologies have created a momentum of their own which is sweeping everyone forward, whether we like it or not.

Decisions such as these must rest in the hands of individuals and communities, and are not to be made unilaterally by public policy makers. Existing government policies which support Internet connectivity, whether direct or indirect, are already subject to certain highly politicized issues, such as filtering: should subsidized bandwidth to communities be filtered, i.e., why should "the taxpayer" subsidize, *e.g.*, gambling, gaming and pornography? Already, bandwidth going to schools under the federal E-Rate program must be filtered to receive a subsidy, although that came as an afterthought to the program.

If rural communities have no Internet connectivity now, it is often because they have no cash money (i.e., there is no cash economy, as in many Alaskan subsistence communities) to pay for it, whether it is a high-cost service or not. What, then, is the strongest economic argument for Alaskans in rural areas to be included in ubiquitous, statewide broadband access? While rural broadband advocates point to the long-term benefits that will accrue in terms of jobs and

economic development, immediate beneficiaries of rural broadband, which have the money to pay for the service, are the travel and ecotourism industries: travelers and tourists will pay for broadband connectivity *to rural communities* because they want the same connectivity *from those communities* when they visit.

What mechanisms currently exist at the federal, tribal, state, and local levels, whether implemented by broadband providers or by governmental or non-governmental entities?

We also seek comment on how the additional mechanisms being implemented pursuant to the Recovery Act, particularly the grant programs at NTIA and the rural broadband programs at the RUS should inform our analysis and development of a national broadband plan.

The best way to leverage BTOP and other broadband-related portions of the Recovery Act is to *encourage* rather than *discourage* those grant applications which take an integrated approach to the multiple funding sources. This means community, regional and even state Applicants should be advised to submit cross-referenced if not interlocking or aggregated applications to build innovative, well-thought-out and complete broadband deployment models which draw on the multiple related ARRA funding opportunities, as well as other federal, state, municipal, community and private (commercial and foundation) resources.

In turn, ARRA funding Agencies should work to coordinate definitions, eligibility rules, match requirements and deadlines to the greatest extent possible under the Act's statutory language to facilitate such interlocking and aggregated proposals and to remain as flexible as possible in supporting such proposals. Integrated cross-program tools should be developed, e.g. a comparison char of eligible services and equipment under both NTIA and RUS programs, if not E-Rate, RHC, and RHCPP too.

Unfortunately, the statutory NTIA grant requirement that forces grantees to certify their projects cannot proceed in the absence of the requested NTIA funding actually seems to discourage innovative proposals. This required certification means that while proposals may be cross-referenced and interlocking in some loose sense, they cannot really be aggregated and highly interdependent but must stand alone; otherwise, if the NTIA grant proposal or any other funding proposal gets turned down, then rest of the applicant's funding requests would, as certified, not be able to proceed either. This requirement of ARRA essentially requires Applicants to have no back-up plan without some substantial modification to the project, which has been designed if not certified as the most innovative, cost effective and efficient approach to the problem of broadband deployment. The "all the eggs in one basket" approach to ARRA funding may not be a wise one.

ARRA funding by itself will never solve the problem of lack of broadband access, penetration and use in every community, or eve n every rural community, but it can be used to help the

nation document and understand the relationship between broadband: (1) awareness; (2) availability; (3) accessibility; (4) training and education; (5) sustainability and (6) affordability.[41]

Similarly, we seek comment on the extent to which programs that provide training and assistance to potential users of broadband are effective and how such programs might fit into the national broadband plan.

ARRA-funded training and assistance programs can help us learn how to effectively transition from communities without broadband to communities with ubiquitous and sustainable broadband in a variety of environments and circumstances, since to some extent, every state is unique in its stage of broadband deployment, the relationship between ISPs and other stakeholders, etc.

There are multiple "chicken and egg" problems nestled among these six concepts listed above. On the one hand, consumers cannot buy a product that is not available, nor can they buy a product of which they are unaware. On the other hand, ISPs will not provide broadband service where there is neither awareness nor demand. Public service organizations become the essential intermediaries that can break through this deadlock to provide – at least during the years before broadband becomes ubiquitous - affordable public broadband access facilities that have appropriate equipment, training, educational outreach, and support staff.

In considering how to best spend ARRA broadband funding there are a couple of truisms to keep in mind:

- True broadband will always be the next generation of service to follow whatever a community can access today. In other words, true broadband is an ever-receding goal that is never to be reached. At this point in broadband development in the United States, and from the standpoint of the knowledgeable user, the best broadband is all the broadband one can afford to buy at any given point in time.

- The equipment and training needed to make full use of true broadband may always be relatively expensive with respect to household income. Vendors will see to it through

[41] By *sustainability* I mean the ability of a provider to build a successful business case for providing broadband services or the financial ability of organizations to provide broadband access to their members or the general public at large. By *affordability* I mean the ability of end users to subscribe to broadband services out of their individual or household budgets, i.e., the take-rate or subscription rate. Broadband services which are unaffordable by the vast majority of the potential subscriber base are unlikely to be sustainable. Broadband penetration can be defined as the result of broadband availability and affordability. Assuming the general desirability of broadband access in almost all communities, a low take-rate would be an indication that some obstacle (lack of awareness, training, equipment or affordable service) remains which is preventing widespread broadband adoption.

branding if nothing else. That is why universal service support will be especially important in these areas on a continuing basis as broadband uses evolve..

Consumers always seem to prefer to taste, or in the case of broadband, "test," before they buy. Educational and public broadband access facilities allow consumers to do this and in so doing these facilities not only increase the demand for broadband but the household penetration or "take-rate" as well. Neither the NTIA nor the RUS programs will be totally successful in the sense that every project will be sustained in the long term or even successful in the short-term. *The ultimate importance of these programs will lie in their ability to help us understand as a nation what makes the difference between successful and unsuccessful broadband deployments in individual communities, regions and states.*

If the national broadband plan is intended simply as a "one time" solution, then a kind of magical thinking has taken over and it will be doomed to failure. What unserved areas desperately need are ongoing funding streams, not one-time "big band" bucks, and it is unlikely that even innovative grants will uncover new sources of ongoing funding. Only in a limited number of situations is "catalyst" grant funding ever successful. The ground must be well-watered and fertile for the seed to grow. The "stimulus" concept itself is the one that should be used to measure long term results in the national broadband plan: what other broadband access and deployment investments took place because of the ARRA broadband funding? What change in the broadband adoption rate occurred due in whole or in part to ARRA funding? What broadband educational and training opportunities were created and how many people took advantage of these opportunities?

Are there additional mechanisms, or changes to existing mechanisms, that the Commission should consider?

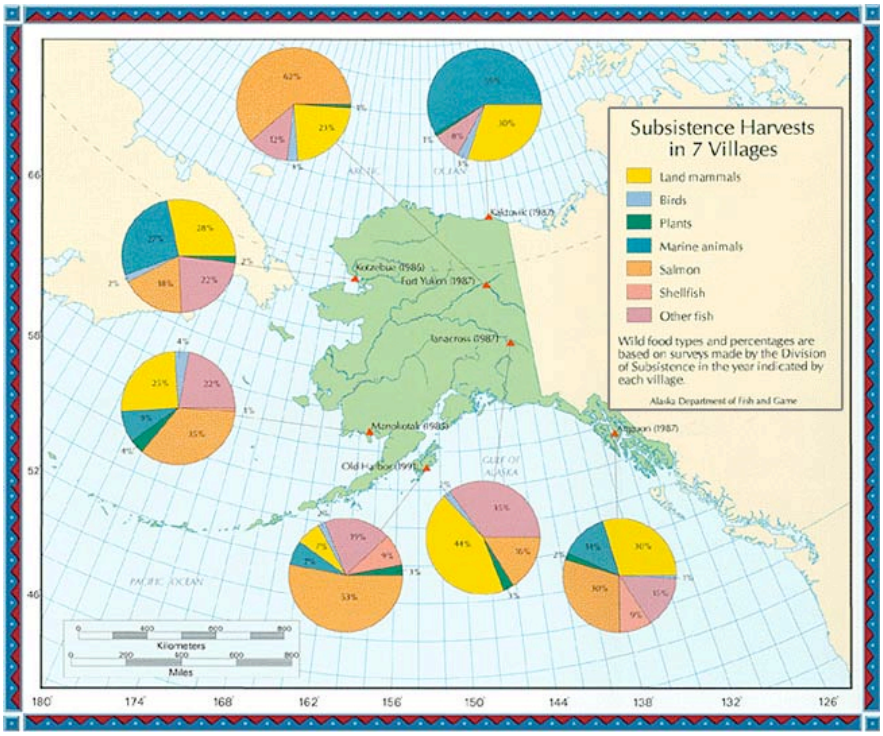
The least and perhaps best that broadband funding Agencies can do is:

- Better coordinate the requirements, deadlines, and application processes of their programs;
- Encourage cooperation by expressing a decided preference for partnership proposals;
- Assert their authority and ask Applicants to consider consolidating their similar or related proposals into a single proposal across funding programs. This would require the sharing of information between funding agencies.

Further, we seek comment on the extent to which existing mechanisms adequately serve the goals of the Recovery Act and can meet the needs of all communities and people across the

nation, including people with disabilities as well as people in urban, rural, insular, Native American and economically distressed communities.

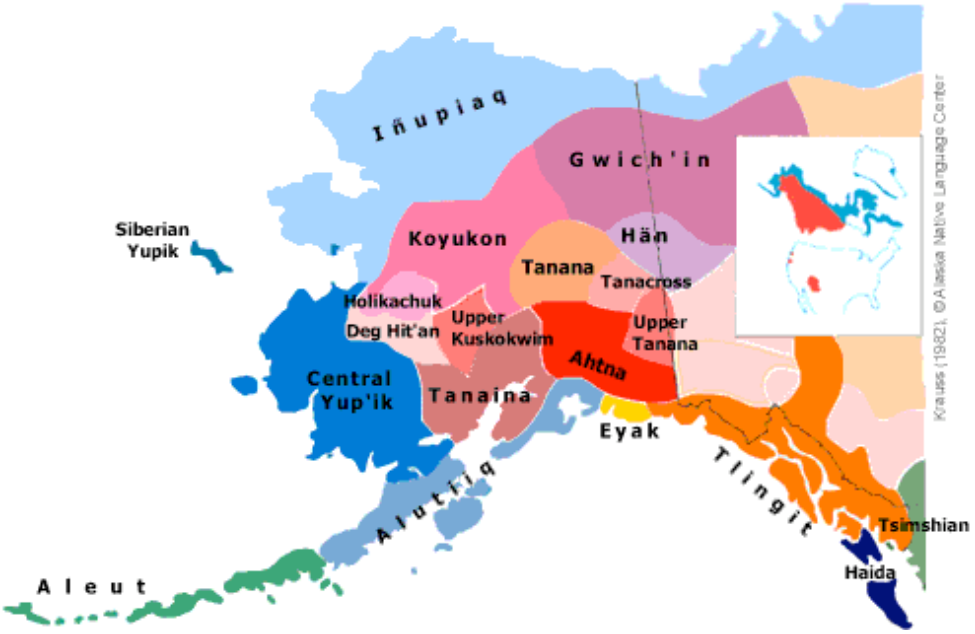
Existing mechanisms do not adequately serve the goals of the *Recovery Act* and do not meet the needs of "all communities and people across the nation" because they use the term "rural" to apply to a widely disparate group of communities, some of which are far different than the normal concept of "rural." Deploying advanced broadband (e.g., fiber) to these few thousand communities may well cost more than deploying broadband to the rest of the country altogether. One must apply the 80/20 rule of thumb at least twice before one gets to these communities: once, to separate urban from rural and again to separate rural from isolated and remote. In Alaska, rural does not necessarily mean "farmland," more often it means wilderness; it does not mean chickens, cattle and pigs, but rather caribou, bear, moose, and salmon. i.e., subsistence living.[42]



The United States is privileged to be the home of some of the most remarkably ancient, tenacious and inventive cultures in the world with respect to minority communities which have survived for millennia in the face of adverse conditions. To simply divide communities between urban and rural is to ignore the history and struggles of these indigenous communities. Alaska's population also sets it apart from the other states. Native Alaskans and Native Americans make

[42] Map from http://www.akhistory.org/index.cfm?FuseAction=viewbottomframe&PageID=43&PageNumber=1

up more than 15 percent of the population in comparison to the American average of less than one percent. According to the U.S. Census Bureau, Alaska's tribes "include Eskimo, Aleuts, Alaska Athabaskan, Tlingit, Haida, Tsimshian, American Indian and 'Tribes Not Reported or Specified.'"[43]



Alaska Native Language Map from www.ankn.uaf.edu

<u>These are the very communities to whom a substantial portion of the ARRA broadband funding should be directed in accordance with congressional intent to reach the unserved and underserved</u>.

At the same time, these also happen to be the smallest of all of our communities, the outliers and the outsiders which seem to get continually left behind when it comes to economic development. If these communities are on the map or recognized by the U.S. Census at all, they do not fall in the normal area of the bell curve. They may not show on the graph at all. Indigenous communities in the United States are, for the most part, beyond "rural" and sometimes even beyond remote. Many of them are isolated and more and more are truly endangered. These are communities in extremis.

Much like the nation's chronically ill which are excluded from health insurance because of pre-existing conditions, indigenous communities often have a pre-existing condition – they have pre-existed the United States! Because of this historical exclusion, the challenges of geography and

[43] Maria Elena and Claudette Bradley, "Hello Out There: A Look at Distance Education in Alaska". *First Monday Journal*, vol. 5, no 10 (October 2000), Online. Available: http://www.firstmonday.dk/issues/issue5_10/reyes/. Accessed: March 9, 2004.

small, dispersed populations, they have been prevented from receiving or affording quality broadband service, if any. Statistically these small dispersed communities areas are a to many federal and state agencies because they do not lend themselves to simple, cost-effective solutions. Even data collected from these areas is usually resigned to last place in the collection process since it is disproportionately expensive.[44]

Determining Costs

Paragraph 38. In order to capably develop a national broadband plan, how useful or necessary is it for the Commission to understand the costs of deploying broadband networks to the unserved and underserved areas of our country?

Yes, it is absolutely useful and necessary. Costs will vary widely by state and by region. For example, due to the highly rural nature of the Alaska; the harsh weather conditions; the numerous ice fields and glaciers; the largest mountain ranges in North America; the dozens of inhabited islands, and a road transportation system which is not a unified one,[45] broadband network deployment costs in Alaska are on an entirely different scale than any urban area and even most rural area costs in the contiguous states.

Alaska lacks the basic infrastructure with which most broadband networks are deployed. The major road system, the one that connects through Canada to the rest of the United States (and there are only two such roads!), does not reach much of the state, the longest route splitting the state up the middle as it goes from Valdez to Deadhorse (Prudoe Bay), following the oil pipeline the whole way. In most small communities, roads are built to get around locally, but they do not connect anywhere. The main mode of transportation between rural communities is by plane or boat. Alaska has more than 14 times as many planes per capita than the rest of the United States.[46] Boats are widely used for fishing. ATVs and snowmobiles are the other principal means of transportation of goods and people and outnumber cars and trucks in most villages. Frozen rivers and lakes often serve as winter highways for transporting major equipment and supplies. Vehicles are moved by ferry, barge and boat; under their own power over frozen lakes and tundra, and even by plane.

Should the national broadband plan seek to bring broadband to 100 percent of the country?

[44] The problem with the new American Community Survey is that it will not get to less populated areas (those below 20,000) until 2010 and after that will only do estimates every five-years (every year for more populated areas), so this data collection mechanism is not really suitable for tracking broadband deployment in underserved and underserved areas. In Alaska it's still worse because the census balks at how expensive it is to visit our villages, which are the majority of our communities. The only concession Census ever made was to have 1 of every 2 residents of our villages fill out the long form, rather than the national 1: 6 ratio, in order not to skew their findings due to the small populations of these communities.

[45] Alaska has many road transportation, but more often than not these systems serve a local community or a hub community and its satellites.

[46] Anchorage.net, *Fact Sheet.* http://www.anchorage.net/library/FactSheet03.pdf. 02/12/04 See http://www.faa.gov/arp/planning/npias/npias2001/appendb/Alas.htm for maps of Alaskan airports.

Yes, it must if the Commission is going meet its legal responsibility to provide advanced high-speed services, which now include broadband access, on a reasonable and comparable basis to the entire nation, as reaffirmed in ARRA. This also assumes that the people of the United States are free to live wherever they want to live within the country and expect to find affordable broadband access .

If so, what are the costs and benefits of bringing broadband to the least densely populated areas?

The short-term costs are still unknown but probably in the hundreds of billions of dollars. The long-term benefits are also largely unknown, but probably in the hundreds of trillions of dollars. To some extent, these costs and benefits depend on how unserved and undererved areas are defined. The term "area" should be defined at the most granular level possible, certainly not the Zip Code, nor even the census tract, but census block The term community has been often used above as a reminder that of the more than 18,000 places in the United States, several thousands of these are communities of less than 1,000, 500 or even 100 persons, where it is virtually impossible to make a business case for services. On top of which, the smaller a community or village may be, the more likely it is to suffer from high unemployment and poverty.

We seek comment on how we can better estimate the cost of deploying various alternative broadband technologies to those areas that the market is not serving, or not adequately serving. Which broadband technologies might work best and deliver the most effective, efficient services in various parts of the nation?

For low-speed broadband (shared bandwidth in the 1.5 mbps range), VSAT installations have proven cost effective and sustainable in smaller Alaska communities, though far less than ideal. With subscription prices in the range of $40-50 per month, it is generally accepted that a viable business case for fractional T-1 access requires at least 15 subscribers or more from a population of at least 50 to 100, depending on the average local income. In addition, a one time equipment/installation fee, often as much as $30,000 as a largely unrecoverable investment in the satellite up-link facility, which is the major obstacle to Internet over satellite in most communities, in addition to the continued maintenance and realignment of the dish..

Should the national broadband plan seek to bring broadband to 100 percent of the country?

Yes, it must if the Commission is going meet its legal responsibility to provide advanced high-speed services, which now include broadband access, on a reasonable and comparable basis to the entire nation, as reaffirmed in ARRA. This also assumes that the people of the United States are free to live wherever they want to live within the country and expect to find affordable broadband access

If so, what are the costs and benefits of bringing broadband to the least densely populated areas?

The short-term costs are still unknown but probably in the hundreds of billions of dollars. The long-term benefits are also largely unknown, but probably in the hundreds of trillions of dollars.

To some extent, these costs and benefits depend on how unserved and undererved areas are defined. The term "area" should be defined at the most granular level possible, certainly not the Zip Code, nor even the census tract, but census block The term community has been often used above as a reminder that of the more than 18,000 places in the United States, several thousands of these are communities of less than 1,000, 500 or even 100 persons, where it is virtually impossible to make a business case for services. On top of which, the smaller a community or village may be, the more likely it is to suffer from high unemployment and poverty.

Why don't these people move? Why did they go to there in the first place? More often than not, most of these communities have been there in one form or another long before the United States ever existed.

We seek comment on how we can better estimate the cost of deploying various alternative broadband technologies to those areas that the market is not serving, or not adequately serving. Which broadband technologies might work best and deliver the most effective, efficient services in various parts of the nation?

For low-speed broadband (shared bandwidth in the 1.5 mbps range), VSAT installations have proven cost effective and sustainable in smaller Alaska communities, though far less than ideal. With subscription prices in the range of $40-50 per month, it is generally accepted that a viable business case requires at least 15 subscribers or more from a population of at least 50 to 100, depending on the average local income. In addition, a one time equipment/installation fee in the range of $30,000, a largely unrecoverable investment in the satellite up-link facility, is required and this is the major obstacle for most communities, in addition to continued maintenance and realignment of the dish.

Paragraph 51. Finally, we seek comment on any national broadband policies or programs adopted by other nations or international organizations that may be useful to the Commission in this proceeding.

Unfortunately, international statistical series from such organizations as the International Telecommunications Union and the United Nations are usually 3-5 years out of date by the time they appear, making the data provided useful in trend spotting and historical analysis, but less useful to policy maker, academic scholars and community activists Given the rate at which ICT is developing, statistical data collection needs to be expedited using innovative collection mechanisms and, at a minimum, needs to be collected on a semi-annual or quarterly basis rather than an annual basis by the most appropriate federal agencies..

Furthermore, existing compilations of international statistics do not necessarily contain the data that is of most interest and greatest use to ICT specialists. Such specialists should be polled to determine the data and information which would make their work more productive and

meaningful and a dialogue should be begun to inform existing statistical publishers of these needs. For example, an initial international comparison of existing ICT-related statistics for arctic nations was conducted in 2006 by the World Bank as part of a world-wide study. The Commission should consult more closely with the World Bank to determine how the various statistical sources used by the World Bank were integrated and when the World Bank plans to update tits ICT at a Glance series.

Finally, we know that in certain categories of ICT statistics, e.g., broadband throughput, there are frequent discrepancies between what companies report they deliver and what consumers say they receive. This often has to do with End User Licensing Agreements (EULAs) which, from the vendor's perspective, require "best effort" to supply the maximum bandwidth, but, from the consumer's perspective, however wrong that may be, are viewed as a guaranteed bandwidth minimum. This issue is worth investigating further to see if end users are getting the bandwidth they pay for and whether Internet and broadband statistics in certain categories are truly comparable. The OECD has done a great deal of research in this area.[47]

Affordability

Paragraph 54. We seek comment on how the Commission should define "affordability" with respect to broadband access. How should affordability be measured?

Affordability should be measured against personal or household income. Though somewhat dated as all Census data is, 7.8 percent of Alaskans in urban areas live in poverty, while 12.4 percent of rural Alaskans live in poverty, and 19.4 percent in rural communities of 1,000 or less are impoverished and unlikely to have disposable income to spend on broadband. [48] Alaska is not alone in this predicament.[49]

Paragraph 57. We also seek comment on the extent to which a centralized clearinghouse for outreach and computer and broadband training initiatives should be a component of the national broadband plan. For instance, what can the Commission learn from prior outreach campaigns? If outreach programs or the development of a clearinghouse of information and programs is warranted, we seek comment on the best ways to incorporate these practices into a national broadband plan.

[47] OECD Policy Guidances of note include: *Convergence and Next Generation Networks* at http://www.oecd.org/dataoecd/49/38/40878993.pdf and *Protecting and Empowering Consumers in Communication Services* at http://www.oecd.org/dataoecd/14/52/40869934.pdf

[48] *http://factfinder.census.gov/home/saff/main.html?_lang=en*

[49] Minnesota state Sen. Steve Kelley has been quoted as saying there is no digital divide in his state terms of access, though there is one in terms of price and that, on average, a rural school district in Minnesota pays about $2,200 per month for a T1 line, while an urban counterpart pays only $300 to $400 per month.

There are at least four general categories of mechanisms that might be used in creating and maintaining a national broadband plan, all of which could focus upon a clearinghouse for information and programs to be utilized by agency staffs, the telecommunication industry, and consumers:

> *1. Transparency mechanisms*. Because ARRA funding is intended to identify and document best and most innovative broadband deployment practices, to be customized if not copied for use elsewhere, all grant documents should be publicly posted on the Internet to the extent that they do not contain clearly identifiable confidential or proprietary information. Confidential or proprietary information should be presented on separate grant application pages which are individually marked as such by header/footers or large watermarks. Confidential or proprietary information should be kept to a minimum to enable the grant program goal of fully documenting practices that can be successfully reproduced or improved upon.
>
> *2. Social Networking mechanisms*. Grant Applicants, Awardees and grant administrators should be encouraged to use a wide variety of social networking and Web 2.0 communication tools among and between groups to expedite and enrich the grant award process and project implementation and administration. For example, web- and video conferencing, listservs, wikis, podcasts, websites, etc.
>
> *3. Program monitoring and research mechanisms*. It is not too soon to begin documenting and analyzing program design processes for better efficiencies not only for current programs but for future programs and the implementation of a national broadband plan. Attention should be given to mapping an accelerated decision-making process that identifies common issues, collects background information and viewpoints, and presents these in summary form to decision-making officials for quick responses, in writing, to the grant applicant and awardee communities.
>
> *4. Feedback mechanisms*. Questions taken under Agency advisement via email, voicemail or face-to-face should be posted on a public FAQ and projected response dates given immediately. Official responses should be posted within 1-2 weeks to maintain overall program consistency, or else a description of why the decision is being postponed be given. A clear appeal process, if there is to be any, should be posted.

A national clearinghouse of this nature could be used to consolidate information and, over time, integrate practices and policies, among agencies. It might itself become the primary vehicle for moving forward on broadband deployment, i.e., a living, interactive national broadband plan.

Subscribership Data and Mapping

Paragraph 61. The Recovery Act requires the Commission to develop a national broadband plan that includes "an evaluation of the status of deployment of broadband service, including progress of projects supported by the grants made pursuant to this section." We note that the

Commission recently revised its Form 477 collection of data regarding broadband subscribership. In particular, the Commission is beginning to collect broadband subscribership data at the Census Tract level, including data on the number of subscribers using different technologies, and at various upload and download speeds. We seek comment on how the Commission can use these data to report on the status of broadband deployment, including any benefits and limitations inherent in these data.

We also seek comment on how additional measures, such as broadband availability data and mapping, would help the Commission to accurately assess the status of broadband deployment. For example, does measurement by Census Tract adequately capture deployment on tribal lands, or in rural areas?

Census Tract measurements do not adequately capture deployment on tribal lands and in rural areas. More granular data is required. Furthermore, Form 477 data, while probably the most important source of broadband deployment data, does not by itself give a balanced and multi-faceted understanding of what is happening with respect to broadband deployment, especially from the consumer's viewpoint. A national broadband plan should consider if not incorporate findings and data from other surveys of broadband deployment. For example, the eCorridors map at http://www.ecorridors.vt.edu/maps/broadbandmap.php is a bottom-up approach that could be quickly used to build a national broadband map based on the end users perspective with relatively little effort. Another model for consideration would be the SpeedMatters efforts which cumulates speed test data and presents the results by state-by-state in written reports. Both sites suffer from the limitations of self-selection and small sampling sizes and have the additional handicap that the raw data is not visualized nor is it directly available to others for analysis, but a similar self-help site hosted by the Commission could overcome those handicaps and serve as a useful counterbalance to Form 477 data.

As mentioned, the weakness of a bottom-up mapping approach is that, for the most part, the respondents are self-selected since no authentication is normally requested or required. However, the larger the response the more accurate the data will be when aggregated: a federal Agency imprimatur on a single, national end-user driven effort would make a huge difference. End users could be encouraged to get involved and to monitor the information on the map from their community. Such a project would force end users and their public access intermediaries to become more knowledgeable about ICT.

The major difficulty is to keep the entire speed test process relatively quick and easy for the end user while at the same time collecting quality data. Unfortunately, at this stage of its development, the eCorridors project requires minimal software installation of JAVA version 1.4.2 or later, software that many rural users do not have installed and which they find difficult to install themselves without assistance. Furthermore, in many cases, the end user computers available to rural residents are simply too old and slow to take much advantage of the applications and general benefits that broadband services can provide.

Results would be immediately made public and the decided advantage of such a map is that they would indicate actual speeds. This would offer some balance – if not a reality check – to ISP reported service speeds. Data from this kind of front-end mapping can be gathered and analyzed in great detail and with a minimum of programming.

Likewise, we seek comment on other types of data, including pricing data that could further assist the Commission in reporting to the public on the availability of broadband services.

Consumers will appreciate having direct access to deployment data. The NTIA/RUS Notice of Inquiry filings on broadband represent a valuable collection of comment on these issues. Consumer level map access could include:

- Areas currently classified as unserved or underserved areas
- Public broadband access points
- Links to state and local broadband training opportunities
- Identification of E911 coverage through available services
- Future plans for deployment with dates and contact information, to the extent providers are willing to provide such information
- ARRA funded broadband grant proposals with links to grant applications

In terms of *broadband service availability*, at a minimum, service footprints and coverage areas of broadband provider offerings, together with links to their webpages for purposes of up-to-date product and pricing information, should be provided to the public. In terms of *service capacity*, providers should be encouraged to provide the following information for display on or through the map, or agree to maintaining such information on their own webpages: whether the network is shared or unshared; oversubscription/ contention ratio; data surcharges; "fair use" policies, seasonal pricing changes, etc. Any mapping grants to states should require the following information to be publicly available:

- Geographic service areas for each broadband service
- Retail (residential and business) and wholesale pricing information, including bundled pricing and multi-year contract pricing
- Network management policies and practices affecting available throughput
    - Network oversubscription/ contention ratios
    - Data surcharges
    - Seasonal pricing variations
    - "Fair use" or "Fair Access" policies, particularly from satellite-based ISPs
    - Average network saturation and latency
- Network reliability (i.e., downtime) statistics

Further, we seek comment on whether the Commission should collect data on broadband use supported through universal service programs.

Yes, as a measure of effectiveness of the USF with respect to broadband deployment, particularly as more High Cost funding is used for broadband deployment. In addition to mapping information listed above, the location of federally and state funded broadband projects, including geographical service areas and anchor public access institutions, should be made publicly available. This would include funding distribution in all USF programs that related to broadband deployment: in the High Cost, E-Rate, RHC and the RHCPP.

If so, how should these data be collected and used? How would the availability of additional data improve efforts to accomplish our broadband goals?

Breaking out USF broadband deployment expenses (or dual use expenditures) would help to identify and document the extent to which market forces and existing USF programs are bringing about a transition to integrated digital communication services via broadband technologies. Collecting that information could serve as a baseline for future USF program changes.

Stimulus Grant and Loan Programs

Paragraph 62. Recent legislation has created several opportunities for organizations seeking to build out broadband infrastructure and services to unserved and underserved areas to receive grants and loans to help defray the cost of deployment, among other things. The Recovery Act provides funding for broadband programs at RUS and NTIA. We seek comment on how the programs in the Recovery Act should be considered as the Commission develops a national broadband plan.

Maximum transparency should prevail in ARRA broadband grant funded projects. At some point in the overall transition to greater transparency in communication services, providers should be expected take greater responsibility for their broadband products and services than they have in the past and should even consider such things as a permanent feedback loop to consumers in terms of their actual throughput (speed and data transfer).

Otherwise, the WFA (Waste, Fraud and Abuse) audits of federal broadband support agencies may move from their current concentration on the grant applicants and awardees to refocus on the a larger issue, the WFA of current *terms of service*. Due to a lack of transparency in current network practices, many consumers view their terms of service as a "shell game" or a "bait and switch" operation. The least ethical broadband providers are abusing the credulity and lack of knowledge of their own subscribers by bundling services together to limit consumer choices and disguise actual broadband speeds. While this is only a minority of unethical providers, there is a wider industry problem that many broadband providers do not live up the promises of their salespeople in terms of bandwidth. While providers may technically meet their "best effort"

contract obligations, many federal broadband subsidy participants are not getting the bandwidth for which they have contracted, nor frequently are consumers in general.

Funding Agency Inspector Generals have a legal obligation to investigate the waste of federal monies which occurs when broadband providers fraudulently advertise and promise their subscribers bandwidth the providers do not – and sometimes cannot possibly - deliver. They do this by oversubscribing their networks and then using additional techniques to throttle subscriber demand for bandwidth, frequently making arbitrary and secret decisions as to who gets how much bandwidth when and for how long. Often characterized as "reasonable" network management practices, these decisions are frequently considered confidential if not proprietary in nature. These practices need to be compiled and openly published so that consumers can make informed and rational choices as to their preferred providers.

Providers should be expected to empower end users to visualize - on a continuing basis - actual subscriber throughput by means of a graph, much like current operating systems measure performance on most computers and workstations. Rather than just the occasional speed test, consumers should be capable of opening such a window at any time and leaving it on if they so choose, even if the overhead might impact performance. These kind of basic feedback mechanisms for consumers, which could empower end users to allocate and reallocate bandwidth among the concurrent applications they are running according to their preferences and needs, are long overdue in the marketplace.

Use of this type of broadband bandwidth feedback device and others should be up to the end user and not, as it is now, solely at the discretion of the broadband provider. In addition, broadband providers should work with their subscribers to educate them on how to interpret the results from such instruments in order to jointly understand where network congestions and slowdowns are occurring, whether on the provider's network or elsewhere on the Internet.

We also seek comment on how we would obtain data regarding the success of these programs. We note that the Recovery Act includes requirements that all grantees report quarterly to NTIA information on the use of grant funding and progress toward fulfilling the objectives of the award.[50] We also note that agencies must make broadband applicant information available on their websites. Further, the Department of Agriculture must submit information to Congress regarding the RUS grants and loans provided under the Recovery Act.

Work collectively with all other agencies involved in broadband deployment to build the centralized clearinghouse as discussed in Paragraph 57 above.

Civic Participation

[50] Recovery Act § 6001(i).

Paragraph 70. The Commission is also instructed to formulate "a plan for use of broadband infrastructure and services in advancing . . . civic participation."[51] We seek comment on how to interpret and implement this portion of the Recovery Act.

Successful deployment of advanced broadband services in rural communities via public anchor institutions will have a revolutionary impact on rural America given that communication within and between these communities and their urban counterparts is highly limited and far from routine, when it exists at all. Colleges and universities; state and federal agencies; and museums and cultural centers currently have little if any capability to deliver distance education, presentations or training to rural residents because advanced broadband services, if available, are too expensive, too cumbersome and unreliable, and too restricted[52] in rural areas. Access to and experience with advanced broadband services are largely limited to students in school. Adults and teenagers who have dropped out of school are often left without access to these technologies.

While rural "broadband"[53] deployment has increased significantly[54] over the last decade, the residential take-rate in rural communities is markedly lower than that in urban areas, largely because of broadband affordability, which is directly linked to the greater levels of poverty and unemployment in rural communities, and to subsistence (i.e., cashless) economies in village Alaska. To an even greater extent than their urban equivalents, rural public anchor institutions - especially schools and public libraries - can and should become the learning centers for new technologies.[55]

We also seek comment on how the goals of open and accessible government aimed at increasing public awareness and participation in government can be amplified by access to broadband. For example, what are new uses of broadband that would further open government and civic participation?

Advanced broadband services are desperately needed in Alaska communities for such things as:

- E-Government programs (state and federal agency outreach, e.g., hunting and fishing licensing and rules, grants administration training)

[51] Recovery Act § 6001(k)(2)(D).
[52] Federal broadband subsidy programs such as E-Rate and RHC support programs have "stovepiped" broadband access in rural America.
[53] "Broadband" in rural areas still often means bandwidth which meets the old FCC minimum of at least 200 kbps in one direction. In 2008, the FCC broadband minimum increased to 768 kbps, this when growing fiber-to-the-home provides 40-100 mbps. Rural broadband in Alaska still lags behind with bandwidth in the 100s of kbps or low (e.g., 1-3) mbps. In other words, what is affordable over a satellite connection.
[54] Going from zero to anything higher is always dramatic, particularly when phrased accordingly, e.g., "rural broadband access has increased by over 400% in the last three years," i.e., it has moved from 2% penetration to 8%!
[55] But remember, the smallest rural communities have no schools: the legal right to a public school in Alaska requires that a community at least 10 school-aged children.
In the absence of a school , the most common substitutes are home schooling, boarding school, or "busing," which in Alaska takes the form of transportation by air or snow mobile.

• Economic development (e.g., job interviews, business meetings)

• Community forums of various kinds (e.g., town hall and regional meetings, legislative and judicial outreach)

• Medical education (e.g., preventive medicine programs, rehabilitation programs and counseling)

• Broadcasting of cultural activities (e.g., museum, zoo and aquariums; language preservation discussion groups, indigenous dance events)

• Library programs (e.g., ICT training, author visits, children's programs, professional training for librarians and library aides)

• Arts and crafts (e.g., hobby groups, native artwork and crafts)[56]

• Personal communications (e.g., communication with dispersed family members in other villages or serving overseas or in the Lower 48, communication thru sign language, etc.)

• Post-secondary training and classes (e.g., career planning, higher education application assistance, mentoring, etc., in addition to actual distance education classes),

• Public awareness campaigns (e.g., substance abuse, Internet safety, domestic violence)

• Mental health programs (e.g., suicide prevention, depression)

• Training (e.g., tax preparation, financial literacy, subsistence skills.)

Community Development

Paragraph 80. The Recovery Act directs the Commission to include in its national broadband plan "a plan for use of broadband infrastructure and services in advancing . . . community development."[57] We seek comment on the interpretation and implementation of this portion of the Act. While one of the benefits of broadband is the ability to connect more efficiently with the global community, we seek comment on how it could be used for developing local communities. For example, how could a local community use broadband Internet access to identify local problems and enhance methods for solving those problems?

[56] Alaska native artwork and crafts are an increasingly important source of cash income in village subsistence economies. A few villages and individual artists have successful websites, while others sell their artwork on eBay.
[57] Recovery Act § 6001(k)(2)(D).

Apart from the obstacle of a vast and diverse geography, the greatest obstacle to broadband deployment in Alaska is the size of our communities: most are *extremely* small when compared to average community sizes of other states. Although Alaska has much in common with rural areas everywhere, its small communities represent one extreme end of the graph of population density and dispersion.

It may be true that broadband grant or loan funding for up-front fiber deployment costs can break an investment deadlock in certain unserved and underserved areas, but the majority of obstacles to rural broadband fiber deployment are not the high up-front costs as much as the on-going costs supported by only a small number of highly dispersed potential subscribers. An Alaskan community must have 10 students to retain its public school, 25 households to have basic telephone service (POTS) from a COLR (Carrier of Last Resort), and even federal post offices have their minimum requirements.[58] By themselves, such communities to do not provide a viable business case for residential broadband deployment unless this can be combined with educational, health care, public safety, and environmental broadband needs and requirements.

Any national broadband plan must ultimately come to grips with the issue of community size if it is to ensure broadband services at comparable rates to all of the people of the United States. Does a community of 1,000 have a right to broadband services at reasonable rates? What about communities with a population of 500? 100? What is a community anyway? Can it be made up of 10 individuals? And what if those individuals are part of the same family, is that a community? What expectations for broadband services should the thousands of citizens have who live in remote and wilderness areas, either as individuals, families or clusters of households?

How can the universal service High-Cost, Low-Income, Rural Health Care, and Schools and Libraries programs be modified to encourage community broadband development?

Any national program to strengthen library services should take state-specific facts into account and retain a certain degree of flexibility at the state level to respond to rapidly changing demographics. Between 1990 and 2000, Alaska's percentage of urban population grew faster than any other state's (4.5%), while its rural population contracted by a similar percentage.[59] That trend is only accelerating. The increased local investments in Alaskan public libraries experienced over the last decade may become a thing of the past as the economies of rural communities in the state falter and limited local funding is refocused on maintaining basic municipal services like water, electricity and waste disposal.

[58] The US Postal Service has a universal service obligation and for that reasons congress has said "No small post office shall be closed solely for operating at a deficit. . . ." (39 U.S.C.101(b)). Congress amended the act to place a temporary moratorium on further service reductions and specifically prohibited closing post offices that served 35 or more families. At the same time, for many years, there has been a long waiting list to open new post offices.

[59] U.S. Statistical Abstracts, , http://www.census.gov/compendia/statab/tables/08s0029.xls

This could mean that rural communities in coming years will be more receptive to federal or private foundation financial assistance, and, to a lesser extent no doubt, to the attached requirements that come with the funding, the enforcement of which is a particular difficulty is rural and remote communities. At the same time, it would also mean that a national program would have to carefully define those communities which would qualify for the program and those which would not, about as sensitive a subject as which military bases should be closed.

Ideally, library services delivered to small and rural communities, whether through a traditional library building or a "library-in-a-box" web-based digital library, might provide an anchor for economic development, particularly when bundled with adult education programs and other forms of federal and state training and outreach. One concept that is worthy of study is the deployment of statewide public videoconferencing networks in rural communities, which might be library-based or library-oriented in terms of services, and also carry the kind of community-focused, educational programming just described.

What is the role of this country's libraries in marshaling broadband access to advance education?

The current inability of many rural libraries and their communities to benefit from advanced broadband services is due to the overall lack of available and affordable broadband capabilities. Rural communities already lag behind the rest of the nation in affordable bandwidth and in the use of advanced technologies. For the most part, they also lack the constant exposure and routine access to Internet-based technologies that one finds in urban areas. Nevertheless, many rural libraries have been pioneers in providing public access computing and Internet access to their communities; in fact, rural libraries are usually the only providers of public Internet access in small communities and villages.

How can a broadband plan maximize the benefits that our nation can derive from distance learning?

The potential benefits of long-term exposure to an immersive broadband environment are largely unknown, as are the potential detriments. We have yet to cycle through a single human generation (i.e., from 5-85 years of age) which has had continuous Internet, not to speak of broadband, access

Are the potential benefits greater in, and should our attention be focused more on, any particular scholastic level, such as grade school, middle school, high school or college?

The potential benefits of broadband access are cumulative and exponential, just as the potential health hazards may be. The benefits become greater over time as an individual's skills, knowledge and abilities increase and as the social aspects of broadband usage develop, mature and become more widely accepted..

There is no particular scholastic level that should be given more attention than another unless it is the progressively earlier age at which children are introduced to broadband services. How these are to be phased in appropriately may have a direct and permanent impact on the child's

personality development and concept of selfhood. Of on-going importance and concern at all scholastic levels is how broadband-based activities are best integrated into the traditional curriculum and how that curriculum needs to change in order to maximize the benefit of broadband access in educational achievement.

Should resources be directed more toward institutions or student locations?

In the short term, resources should be directed towards institutions because those are where the majority of students spend most of their time learning. In the long term, however, resources should become more decentralized and support student learning wherever it may occur.

Does the potential to take online courses and earn a degree from a remote location increase the chances that people will earn a degree?

Yes, absolutely when there is no alternative. In most Alaska communities, this is the *only* way people can earn degrees without migrating to an urban area. In many ways, blended learning strategies that combine face-to-face teaching and remote learning technologies are the ideal, but this cannot always be achieved. Synchronous on-line learning, whether involving VOIP and document sharing or full-blown teleconferencing provide the only educational opportunities in most Alaska communities and even these are highly limited because of a lack public anchor institutions with broadband access and available or affordable residential broadband service. This lack of educational opportunities only adds to the economic crisis in these communities and undermines their viability as communities.

Paragraph 91. The Commission's E-rate program helps schools and libraries obtain affordable telecommunications, Internet access and internal connections by providing discounts on eligible equipment and services. We seek comment on how this program fits into a national broadband plan.

Modern telecommunication facilities can be used to provide and maintain a wide-variety of library services, including the delivery of multimedia substitutes for more traditional formats. Access to digital library services, however, are increasingly dependent on high-speed connectivity (i.e., broadband in the low megabits or above) and often require end users have advanced Internet and PC skills. Alaska rural residents, already on the wrong side of the urban/rural economic divide, are also the least prepared to make effective use of online library resources, lacking access to and experience with the Internet.

Providing affordable broadband to all residents of Alaska is a problem that the state, working with the telecommunications industry, has yet to solve, despite substantial annual subsidies from the Universal Service Fund. Once again, this is largely due to geography and the dispersal of the rural population of the state in village communities. Communities in Alaska not on the state road system have higher telecommunication costs, often by factors as high as 10 or 20 times.

For example, a T1 (1.5 mbps) over fiber in the Lower-48 or Anchorage may average between $300-400 per month, but equivalent bandwidth via satellite, often the only alternative in remote and rural areas, can easily range from $3,000-10,000 per month. While fiber can be run parallel to roads and gas lines, there is no evidence that it can be run over or under tundra and permafrost without significant environmental damage. Alaska is experimenting with larger microwave installations (e.g., DeltaNet) and adding marine fiber cable in several coastal areas (e.g., Southeast, Kodiak), but its dependence on over $200 million in annual USF monies is worrisome, given that USF will probably undergo major reform in the next few years.

Because E-rate is the most successful program for subsidizing Internet connectivity to rural communities, and because Alaska has many more community schools than public libraries, a digital divide has developed between schools and homes in rural villages, a divide reflected in the split between children and their parents when it comes to accessing and understanding of the Internet. In Alaska, libraries (with $1.4 million in E-Rate funding in 2007) have not participated in E-Rate to the same extent as schools (nearly $20 million in funding in 2007) for several reasons, including: the administrative paperwork burden; the First Amendment aspects of CIPA-required filtering; and a lack of overall IT vision and IT support for greater connectivity and networking.

Paragraph 101. Further, how should the Commission consider the role of broadband as an enabling infrastructure for the creation of jobs and economic growth?

Alaska's improving telecommunication infrastructure provides some new opportunities for product development and marketing. Examples of new economic opportunities based on technology include the use of E-bay to market arts and crafts and even fish products directly from the villages. Eco-tourism and cultural tourism opportunities can also be directly marketed over the Internet. Other technology-related service companies could operate in the Bush if a properly trained workforce was available. In terms of economic growth, providing services locally rather than in Anchorage or other hub cities would keep money re-circulating locally, while filling local professional positions with village residents would provide greater cash income. Local rural health care clinics have already improved telemedicine services so that many patients can be diagnosed and treated in their own communities rather than being evacuated to Anchorage.

In the absence of reliable, residential broadband access, what is missing are the opportunities for distance delivery of education that would prepare rural residents to fill professional positions in their own villages, especially teaching positions. As the biggest economic engine in most rural communities, the schools provide the largest number of sought after and prestigious jobs, but few local residents qualify for these positions because they have not means of acquiring their teacher certification without leaving their communities.

Paragraph 122. We recognize the gravity and scope of this forward-looking undertaking, the incredible value of ubiquitous broadband, and the difficulties that lie ahead in ensuring its availability. While bold action may be necessary, we recognize the need to approach an endeavor as vital as a national broadband plan with a spirit of collaboration, transparency, and openness. Accordingly, we seek comment on those issues discussed above, as well as any facts or issues not otherwise addressed in this NOI relating to the adoption or implementation of a national broadband plan.

The reply comment deadline is too short to ensure that respondents have time to read and compare the filings by others in order to submit relevant and necessary replies. An extension of the reply deadline to June 22 or 29 is in order.

Furthermore, there should be other opportunities –as many as possible – for the public to participate and offer suggestions for the plan as it develops over the coming months before it is submitted to Congress.